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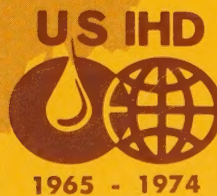
INTERNATIONAL FIELD YEAR FOR THE GREAT LAKES

YGL BULLETIN

NO.14



IFYGL



June 1975

INTERNATIONAL FIELD YEAR FOR THE GREAT LAKES

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UNITED STATES

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CANADA AND UNITED STATES



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IFYGL BIBLIOGRAPHY

A joint Canadian-United States list of publications related to IFYGL was included in IFYGL Bulletin No. 13, and will appear, cumulatively, in all subsequent issues. Additions will be identified as such in each Bulletin. Any questions, comments, or additions to the bibliography should be addressed to one of the IFYGL Coordinators as follows:

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Official IFYGL Publications

IFYGL Bulletin Nos. 1-12 (January 1972 to December 1974) ^{1, 2}

IFYGL Technical Plan, Volumes 1-4 (series complete, 1971) ^{1, 2}

IFYGL Canadian Projects, March 1972 (series complete, 1973) ²

Canadian Projects Supplement No. 1, July 1972

" " " No. 2, October 1972

" " " No. 3, February 1973

" " " No. 4, June 1973

IFYGL Technical Manual series ^{1, 2}

No. 1 "Methods of Measuring Soil Moisture" by R. G. Wilson, 1972.

No. 2 "Radiation Measurement" by J. Ronald Latimer, 1972.

No. 3 "Measurement of Currents in the Great Lakes" by M. D. Palmer, 1973.

No. 4 "U.S. IFYGL Precipitation Data Acquisition System" by A. L. Hansen, J. W. Wilson, C. F. Jenkins, L. A. Weaver, 1973.

No. 5 "U.S. IFYGL Shipboard Data Acquisition System" by A. Robertson, 1974.

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¹ Available in the United States from the
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² Available in Canada from the
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- Ball, J. T., "Cloud Analysis and Diagnosis Over Lake Ontario and Vicinity," The Center for the Environment and Man, Inc., Hartford, Connecticut.
- Bannerman, R. T., and R. E. Armstrong, "Phosphorus Mobility in Lake Ontario," University of Wisconsin, Madison, Wisconsin.
- Bean, B. R., C. B. Emmanuel, R. O. Gilmer, and R. E. McGavin, "On the Spatial and Temporal Variations of the Turbulent Fluxes of Heat, Momentum and Water Vapor Over Lake Ontario," Environmental Research Laboratories, NOAA, Boulder, Colorado.
- Bean, D. J., and R. B. Moore, "The Distribution of Phytoplankton Related to the Transport and Mixing of Water in the Oswego River Mouth," State University College of New York, Oswego, New York.
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- Glooschenko, W. A., and J. O. Blanton, "Short-Term Variability of Chlorophyll a Concentrations in Lake Ontario," Canada Centre for Inland Waters, Burlington, Ontario.
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CANADA

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CANADIAN PROJECT REPORTS

- Notes: 1. Projects are numbered consecutively.
2. The letters following the number indicate which panel has prime responsibility for the project.

BC - Biology-Chemistry
 BL - Boundary Layer
 EB - Energy Budget
 ME - Lake Meteorology and Evaporation
 TW - Terrestrial Water Balance
 WM - Water Movement
 F - Feasibility

Project

1F: *Remote Sensing*

Principal Investigator: K.P.B. Thompson - CCIW

The project is complete. Three scientific papers have resulted from this project, and are listed in the IFYGL Bibliography. Two were authored by the Principal Investigator and a third is listed under R.P. Bukata.

3WM: *Statistical Prediction of Lake Currents*

Principal Investigator: H.S. Weiler - CCIW

This project has been cancelled and there will be no material submitted to the IFYGL Data Bank.

4WM: Included in Project 45WM: *Lake Current Measurements*

5BL: *Direct Measurement of Energy Fluxes*

Principal Investigator: M. Donelan - CCIW

Two papers have resulted from this project to date, and have been accepted for publication in the Proceedings of the 17th Conference on Great Lakes Research (IAGLR). They are entitled "Determination of the Aerodynamic Drag Coefficient from Wind Set-up" and "Generalized Profiles of Wind Speed, Temperature, and Humidity" and are listed in the Bibliography under the Principal Investigator.

8EB: *Shore Gauging Stations of Water Temperature*

Principal Investigator: D.G. Robertson - CCIW

A report on the results of the observations should be completed

by April 1975. The final report on Project 42EB by F.M. Boyce will contain a chapter on this particular project.

9EB: Included in Project 42EB:

11TW: *Monthly Water Balance of the Lake Ontario Basin*

Principal Investigator: D.F. Witherspoon - IWD, Cornwall

The calculations for this project are complete. The final report will be in the Terrestrial Water Balance Panel Report. The following is a list of scientific papers that resulted from this IFYGL project:

Witherspoon, D.F. "A Hydrologic Model of the Local Lake Ontario Basin", Technical Bulletin No. 31. Inland Waters Branch, EM&R, Ottawa, Canada, 1970.

Witherspoon, D.F. "Storage in the Water Balance of the Lake Ontario Basin", Proceedings, World Water Balance Symposium, Reading, England, 1970.

12TW: *Monthly Water Balance of Lake Ontario*

Principal Investigator: D.F. Witherspoon - IWD, Cornwall

This project is essentially complete except for the writing of the final report of the Terrestrial Water Balance Panel. The outline of the report is before the Joint Management Team for approval. Final results await radar precipitation final values for the lake. The following papers have resulted from this project:

Witherspoon, D.F. "General Water Balance of Lake Ontario and Its Local Land Basin", International Geographical Congress, Montreal, August, 1972.

DeCooke, B.G. and D.F. Witherspoon. "Preliminary Lake Ontario Water Balance During IFYGL", Proceedings, 16th Conference, Great Lakes Research (IAGLR), Sawmill Creek, Ohio, April 1973.

Witherspoon, D.F. and B.G. DeCooke. "An Estimate of the Water Balance of Lake Ontario During IFYGL", Proceedings, IFYGL Symposium, 55th Annual Meeting, American Geophysical Union, April 8-12, 1974.

13TW: *Groundwater Flow into Lake Ontario*

Principal Investigator: D.H. Lennox - IWD

This project is complete. Two publications have resulted under the authorship of C.J. Haefeli and are listed in the IFYGL Bibliography.

14TW: *Hydrology of Lake Ontario*

Principal Investigator: E.A. MacDonald - IWD

The data has been submitted to the IFYGL Data Bank and the project is now complete.

15BL: *Space Spectra in the Free Atmosphere*

Principal Investigators: G.A. McBean and E.G. Morrissey - AES

Two papers have resulted from this project to date: "On the Spectral Structure of Turbulence in the Atmospheric Ekman Layer" by B.R. Kerman and "Reduction and Preliminary Analysis of Mesoscale Meteorological Data provided by NAE Low Level Research Flights in Connection with the IFYGL Program Technical Report", by D.W.B. Prentice.

16ME: *Airborne Radiation Thermometer Survey*

Principal Investigator: J.G. Irbe - AES

This project is complete. A complete report was included in IFYGL Bulletin No. 9.

18ME: *Climatological Network*

Principal Investigator: J.A.W. McCulloch - AES

This project is complete.

19ME: Included in Project 66ME.

20ME: *Bedford Tower Program*

Principal Investigator: J.A.W. McCulloch - AES

A software company has been commissioned to write the necessary program to convert from sensor output to scientific units and to apply calibration corrections. The program has been written and is in the process of being perfected. Data will then be prepared for archiving at AES.

21ME: *Canadian Shoreline Network*

Principal Investigator: J.A.W. McCulloch - AES

Preliminary tape for the first six months for three stations has been submitted to the Data Bank in March with data for the remaining three stations being available by the end of June.

22ME: *Synoptic Studies*

Principal Investigators: J.A.W. McCulloch and M.S. Webb - AES

Little work will be done until data are available from Canadian Shoreline stations, and U.S. towers, buoys, and shoreline stations.

23ME: *Radar Precipitation*

Principal Investigator: D.M. Pollock - AES

Data processing for this project is proceeding at a rapid rate with February seeing a doubling of the number of radar photographs quality-controlled and placed on magnetic tape. The programs for the analysis of precipitation gauge data only has been completed and some intercomparison of radar-precipitation gauge data is taking place.

24ME: *Climatological Studies*

Principal Investigator: D.W. Phillips - AES

The IFYGL Data Bank has been provided with a complete set of six-hourly weather maps on microfilm, covering the IFYGL Data period. The paper "Climatological Weather Highlights During IFYGL" was presented at the 17th Conference on Great Lakes Research (IAGLR). The series "IFYGL Weather Data" for the Field Year is in the process of being edited and prepared for publication in an AES Technical Memorandum.

25ME: *Lake Ontario Evaporation by Mass Transfer*

Principal Investigator: J.G. Irbe - AES

Monthly and daily evaporation estimates have been prepared by the mass transfer method, and have been submitted to the Evaporation Synthesis Group.

26ME: *Wind and Humidity Ratios*

Principal Investigator: J.G. Irbe - AES

No further progress to report.

27ME: *Island Precipitation Network*

Principal Investigator: J.A.W. McCulloch

The data has been published in Supplementary Precipitation, Vol. 4, No's. 2 and 3.

28BL: *Momentum, Heat, and Moisture Transfer*

Principal Investigators: G.A. McBean, H.C. Martin, R.J. Polavarapu -AES

Data analysis is complete and a comprehensive data report has been submitted to the IFYGL Data Bank. The Data Report was presented in Bulletin No. 13.

29BL: *Space and Time Spectra*

Principal Investigators: F.B. Muller and C.D. Holtz - AES

Data for the synoptic network has been provided to the IFYGL Data Bank. Additional data from the meso-scale network are held by the Principal Investigators.

30F: *CCGS Porte Dauphine - IFYGL Operations*

Principal Investigator: G.K. Rodgers - CCIW

Completed.

32EB: *Thermal Bar Study*

Principal Investigator: G.K. Rodgers - CCIW

Further progress is not likely until the results of the study regarding the heat content change of Lake Ontario are made available.

34WM: *Circulation Near Toronto*

Principal Investigator: G.K. Rodgers - CCIW

The final report is in preparation.

36EB: *Electronic Bathythermograph*

Principal Investigator: G.K. Rodgers - CCIW

This project is complete.

38TW: *Groundwater*

Principal Investigator: R.C. Ostry - OME

No further progress to report. See Bulletin No. 11 for the last detailed report.

40WM: *Coastal Chain Study*

Principal Investigator: G.T. Csanady - University of Waterloo

Completed.

42EB: *Heat Storage of Lake Ontario*Principal Investigator: F.M. Boyce - CCIW

Final report on this project is being prepared.

43EB: *Internal Wave Measurements*Principal Investigator: F.M. Boyce - CCIW

Final report is being prepared.

44BL: *Analysis of Energy Fluxes*Principal Investigator: F.C. Elder - CCIW

This project is complete. The paper "Preliminary Energy Balance of Lake Ontario for the period May through November 1972" was presented at the 17th Conference on Great Lakes Research (IAGLR).

45WM: *Lake Current Measurements*Principal Investigator: E.B. Bennett - CCIW

There is no further progress to report beyond that outlined in the paper "IFYGL Water Movement Program" co-authored by E.B. Bennett and J.H. Saylor. This paper was published in Proceedings, IFYGL Symposium, 55th Annual Meeting of the American Geophysical Union, Washington, D.C., April, 1974.

46TW: *St. Lawrence-Niagara River Measuring Program*Principal Investigator: M.H. Quast - IWD

This project is complete. The data report has been submitted.

47TW: *Computer Modelling*Principal Investigator: L.E. Jones - University of Toronto

No report available.

49TW: *Snow Stratigraphy and Distribution*Principal Investigator: W.P. Adams - Trent University

No report available.

54BC: *Groundwater Supply Near Kingston*Principal Investigator: W.A. Gorman - Queen's University

One paper has resulted from this project which is now complete.

The paper entitled "Geochemistry of Deadman Bay Near Kingston, Ont" was prepared by L.M. Johnston as a M.Sc. Thesis.

55EB: Included in 32EB.

62ME: *Evaporation Synthesis*

Principal Investigator: J.A.W. McCulloch - AES

A meeting of the Evaporation Synthesis Group was held in November 1974, in Windsor, Ontario. Preliminary results in the various evaporation projects were presented and the future activities of the synthesis group were discussed. Indications were that little progress could be made by the group for another year, until some of the evaporation studies were nearer completion.

63EB: *Airborne Ice Reconnaissance*

Principal Investigator: T.B. Kilpatrick - AES

This project is complete. A detailed report of the project's activities was included in Bulletin No. 9.

64ME: *Atmospheric Water Balance Study*

Principal Investigator: H.L. Ferguson - AES

A comprehensive report on this project was included in Bulletin No. 12. Two papers have resulted to date: "The Atmospheric Budgets Program of IFYGL" by E.M. Rasmusson, H.L. Ferguson, J. Sullivan and G. den Hartog; and "A Spectral Investigation of Horizontal Moisture Flux in the Troposphere" by A.D.J. O'Neill and H.L. Ferguson. Both publications are listed in the Bibliography.

65ME: *Special Shoreline Evaporation Pan Network*

Principal Investigator: J.A.W. McCulloch - AES

The data collection is complete, and the data are now being processed by the United States Office of Hydrology, with further progress pending the availability of dew-point data from the U.S. shoreline network.

66ME: *Basin Evapotranspiration*

Principal Investigator: H.L. Ferguson - AES

This project is now complete. A status report was presented in Bulletin No. 12, the abstract of a paper "Monthly Evapotranspiration Estimates for the Canadian Land Portion of the Lake Ontario Basin During IFYGL" by H.L. Ferguson and W.D. Hogg. This paper has been accepted for publication in the Proceedings, 17th Conference for Great Lakes Research.

67ME: *Surface Water Temperature Distribution*Principal Investigator: M.S. Webb - AES

The following paper from this project will appear in the Proceedings of the 17th Conference on Great Lakes Research (IAGLR) - "Mean Monthly Temperatures of Lake Ontario During the 1FYGL" by M.S. Webb.

68F: *CCIW Supporting Resources*Principal Investigator: P.G. Sly - CCIW

Continues.

69TW: *Pleistocene Mapping*Principal Investigator: E.P. Henderson - GSC

No report available.

70WM: *Ground Truth for Remote Sensing*Principal Investigator: J.A.W. McCulloch - AES

No report available. See Bulletin No. 10 for last report.

71EB: *Canadian Radiation Network*Principal Investigator: J.A.W. McCulloch - AES

See project 80EB.

72EB: *Floating Ice Research*Principal Investigator: R.O. Ramseier - DOE, Ice

Two papers have resulted from this project; "Studies on the Extension of Winter Navigation on the St. Lawrence River" by R.O. Ramseier and D. Dickins, and "Navigation Season Extension Studies, Gulf of St. Lawrence to Great Lakes, Winter 1972-73", by D. Dickins.

73EB: *Terrestrial Heat Flow*Principal Investigator: A. Judge - EM&R

Last reported in Bulletin No. 10.

74TW: *Water Level Network*Principal Investigator: G.C. Dohler

An extensive report was included in Bulletin No. 12.

75BL: *Wind and Temperature Fluctuations*

Principal Investigators: S.D. Smith and E.C. Banks - Bedford Institute

This project was completed with the publication of: "Eddy Flux Measurements Over Lake Ontario" by S.D. Smith, Boundary Layer Meteorology, Vol. 6, pp. 235-255. Some additional comparison work may be undertaken when Niagara Bar data from Donelan (CCIW) and McBean (AES) are available.

76WM: *Surface Wave Studies*

Principal Investigator: G.L. Holland - MSD

No report available.

78TW: *Basin Water Balance*

Principal Investigator: M. Sanderson - University of Windsor

This project has been cancelled.

79F: *Bathymetric Surveys of Lake Ontario*

Principal Investigator: T.D.W. McCulloch - CCIW

This project is complete.

80EB: *IFYGL Radiation Balance Program*

Principal Investigator: J.A. Davies - McMaster University

This project was completed with the publication of "Canadian Radiation Measurements and Surface Radiation Balance Estimates for Lake Ontario During IFYGL" by J.A. Davies and W.M. Schertzer. All data measurements have been submitted to the Data Bank.

81BC: *Materials Balance - Lake Ontario*

Principal Investigator: S. Salbach - OME

A comprehensive report was included in Bulletin No. 12.

82BC: *Lake Ontario Zooplankton Migration*

Principal Investigator: J.C. Roff - University of Guelph

Last reported in Bulletin No. 9. One paper, "Energetics of Vertical Migration in Mysis relicta Loven 1862" by J.B. Foulds, has resulted from this project.

83BC: *Cooperative Studies of Fish Stocks*Principal Investigator: W.J. Christie - OMNR

Last reported in Bulletin No. 12.

84BC: *Cladophora Growth*Principal Investigator: G.E. Owen - OME

Data gathered during the Field Year are in the form of imagery. Little progress has been made to date in data extraction from the imagery, but work will get underway this winter. All data and results will be presented in the final report on this project to be completed by summer 1975.

85BC: *Nutrient Cycles - Lake Ontario*Principal Investigator: A.S. Fraser - CCIW

A paper dealing with this project is in the final phase of preparation.

87EB: Included in Project 42EB.

89WM: *Turbulent Diffusion Studies*Principal Investigator: C.R. Murthy - CCIW

A number of scientific papers resulted from this project and are listed in Bulletin 13, and included in the IFYGL Bibliography. For a complete project report, see Bulletin No. 11.

90WM: Included in Project 89WM.

94: *Data Retransmission by Satellite*Principal Investigator: H. MacPhail - CCIW

The final report on this project is completed, and is entitled "Data Retransmission via satellite, Field Year 1972" authored by the Principal Investigator.

95WM: *Hydrodynamic Modelling*Principal Investigator: T.J. Simons - CCIW

For a complete report see Bulletin No. 12. There were five scientific papers published from this project to date, and they are listed in the Bibliography under the name of the Principal Investigator. Two additional papers were presented at the 17th Conference on Great Lakes Research (IAGLR).

96WM: Included in Project 45WM.

97BL: *Meteorological Buoy Measurements*

Principal Investigator: F.C. Elder - CCIW

This project is complete and all data has been submitted to the Data Bank.

98BC: *Lake Ontario Cross Section Study*

Principal Investigator: M. Munawar - CCIW

A paper resulting from this project was presented at the 17th Conference on Great Lakes Research (IAGLR) 1974, entitled "Phytoplankton Biomass, Its Species Composition and Primary Production at a Nearshore and Midlake Station of Lake Ontario During IFYGL", by M. Munawar, P. Stadelmann and I.F. Munawar.

101BC: *Lake Ontario Primary Production Study*

Principal Investigators: M. Munawar and J.E. Moore

The project has been completed. The last report was given in Bulletin No. 12.

102BC: *Lake Ontario Diel Pigment Variation*

Principal Investigators: W. Glooschenko and M. Munawar - CCIW

This project is complete. The abstract of the final paper was included in Bulletin No. 12.

103BC: *Pesticide Concentration in Bird's Eggs*

Principal Investigator: M. Gilbertson - CWS

The project is progressing well. Four papers have resulted to date and are listed in the IFYGL Bibliography under the Principal Investigator.

104BC: *Rain Quality Monitoring*

Principal Investigator: M. Shiomi - CCIW

No report available. See Bulletin No. 9 for last complete report.

107BL: *Air Pollution Sinks*

Principal Investigator: D.M. Whelpdale - AES

This project is complete. Two publications have resulted: "Sulphur Dioxide Removal by Turbulent Transfer over Grass, Snow and

Water Surfaces" by D.M. Whelpdale and R.W. Shaw; and "Sulphate Deposition by Precipitation into Lake Ontario" by R.W. Shaw and D.M. Whelpdale. Both are listed in the IFYGL Bibliography.

108BL: *Lake Level Transfer*

Principal Investigator: G.C. Dohler - MSD

This project is complete.

109WM: *Upwelling Study*

Principal Investigator: G.K. Rodgers - CCIW

The Final Report is in preparation.

110WM: *Hydro Intake Study*

Principal Investigator: A. Arajs - OH

This project was completed with the paper "Nearshore Currents and Water Temperatures Along the North Shore of Lake Ontario Between Pickering and Cobourg" by A.A. Arajs and R. Faroqui.

111WM: *Lakeview Dispersion Study*

Principal Investigator: M.D. Palmer - OME

This project is complete, and all the data have been submitted to the IFYGL Data Bank.

112BC: *Threespine Stickleback*

Principal Investigator: E.T. Garside - Dalhousie University

No report available. Last reported in Bulletin No. 9.

114WM: Included in Project 89WM.

115WM: *Wave Climatology*

Principal Investigator: H.K. Cho - CCIW

The data has been submitted to the Data Bank.

116TW: *Airborne Gamma Ray Snow Survey*

Principal Investigator: H.S. Loijens - IWD, Glaciology

The project was last reported in Bulletin No. 9. The project has been terminated; however, research in the use of natural gamma radiation for snow-water equivalent and soil moisture determination is continuing.

117ME: *APT Photographs*

Principal Investigator: J.A.W. McCulloch - AES

This project is now completed. The microfilm is on file at the IFYGL Data Bank.

118: *Canadian IFYGL Data Bank*

Principal Investigator: J. Byron - CCIW

Cat. No. 3-118-035	IFYGL Bulletin No. 12
Cat. No. 3-118-036	The "IFYGL". J.A.W. McCulloch
Cat. No. 3-118-037	The IFYGL, An Example of an International, Interagency, and Interdisciplinary Approach to a Research Program in Water Resources
Cat. No. 3-118-038	Hydrometeorological Studies in Support of the IFYGL. T.L. Richards

CANADIAN IFYGL DATA MANAGEMENT REPORTIFYGL Data Publications

On July 31, 1974 a publication titled "Canadian IFYGL Projects Data Submissions" was prepared and a copy sent to each Canadian Principal Investigator. This publication listed, in a very brief way, the actual data and information supplied to the Canadian IFYGL Data Bank. This information is currently up-dated on a monthly basis by a publication titled "Canadian IFYGL Data Bank Newsletter".

It has been decided that copies of the "Canadian IFYGL Projects Data Submissions" will be produced and mailed to Principal Investigators once a year until a final "IFYGL Information and Data Catalogue" is published. Preliminary discussion between the U.S. and Canadian IFYGL Data Managers concerning this final catalogue have already begun.

Copies of the "Canadian IFYGL Project Data Submissions" may be obtained by addressing a request to:

Canada Centre for Inland Waters
867 Lakeshore Rd., P.O. Box 5050
BURLINGTON, Ontario
L7R 4A6

Att: J.W. Byron
Manager
Canadian IFYGL Data Bank

National Climatic Center
IFYGL Data Management
Room 52, Federal Building
ASHEVILLE, N.C. 28801

Att: W.T. Hodge
Manager
U.S. IFYGL Data Bank

Data Summaries

The Canadian IFYGL Data Bank is currently preparing to provide listings of 10 minute Meteorological and Current Meter data on microfilm. This is the data from projects 97BL and 45WM.

Canadian Editor's Note: Abstracts of many IFYGL papers have been presented in previous IFYGL Bulletins, and this practice is continued. In each Bulletin, an attempt will be made to present a cross-section of IFYGL investigations through these abstracts.

THE UTILIZATION OF SUN-GLINT IN A STUDY OF LAKE DYNAMICS

R.P. Bukata and W.D. McColl

(IFYGL Project 1F)

A series of low, medium and high altitude overflights provided visible and infra-red data of Lake Ontario and its surrounding basin in June, 1972. A study of the areas illuminated by mirror-reflected solar illumination (sun-glint) is described with regard to the physical properties of sun-glint present in aerial photographs and the role of sun-glint in evaluating the nature of the dynamical processes occurring within the lake and which, in general, display surficial features. A detailed investigation is presented of the role of sun-glint in evaluating the dynamics defining the June 7, 1972 upwelling event off the north shore of Lake Ontario, an event for which considerable ancillary ground-truthing was available. By combining the aerial photography with the existing ground-truth it is concluded that both a spatial and a temporal change in the thermal time-gradient are required to produce surface features that may be readily discernible in sun-glint (i.e. a non-zero value of $\left[\frac{d}{dx} \left(\frac{dT}{dt} \right) \right]$ must exist).

(KEY TERMS: sun-glint; lake dynamics; upwelling, Lake Ontario; aerial photography)

LAKE ONTARIO: EFFECTS OF EXPLOITATION, INTRODUCTIONS, AND EUTROPHICATION ON THE SALMONID COMMUNITY^{1,2}

W.J. Christie

(IFYGL Project 83BC)

Commercial catch statistics were analyzed to follow the sequence of events in the deterioration of the major fish stocks of Lake Ontario. Atlantic salmon (*Salmo salar*), lake trout (*Salvelinus namaycush*), burbot (*Lota lota*), deepwater ciscoes (*Coregonus* sp.), and whitefish (*Coregonus clupeaformis*) have all disappeared or declined seriously in abundance. Only the colonists alewife (*Alosa pseudoharengus*), smelt (*Osmerus mordax*) and white perch (*Morone americana*) are currently abundant. Abundance of deepwater ciscoes is thought to have been controlled originally by the piscivores lake trout and burbot. Three deepwater cisco species are inferred to have been progressively eliminated by overfishing, leaving only the smallest and least valuable present when the fishery collapsed. The effects of the sea lamprey (*Petromyzon marinus*) on the Lake Ontario fishes are held to have increased with the reduction of the number of dams in the watershed, and as fishing reduced numerical abundance and average size of the prey fishes. The early colonists alewife and carp (*Cyprinus carpio*) were thought to have stabilized early. It was suggested smelt were suppressed for many years by trout and burbot predation, and after the release of this constraint, the smelt in turn caused the collapse of the deepwater ciscoes and other species through predation. The white perch invasion of the Bay of Quinte was thought

particularly swift and successful because of the absence of predators. Yellow perch (*Perca flavescens*) abundance may have increased because of eutrophication effects in the nearshore areas. Recent deterioration of water quality appears so extreme as to ensure that the last premium species which used the inshore areas cannot return. Overfishing is thought to have been the major destabilizing influence. The role of the open lake predators in the vectoring of energy and materials through the system is discussed.

AN EXPERIMENTAL GAMMA-RAY SPECTROMETER
SNOW SURVEY OVER SOUTHERN ONTARIO
R.L. Grasty, H.S. Loijens, and H.L. Ferguson
(IFYGL Project 116TW)

In the winter of 1972-1973, four gamma-ray spectrometer surveys, each 1850 km long, were flown over Southern Ontario at 150 m, using a 50,000 cm³ sodium iodide detector system. Total radioactivity and potassium information was used to calculate a snow-water equivalent for 16 km sections along each flight line. The airborne results are compared with ground data from 10 snow courses established along the flight lines.

A root mean square deviation of 1.2 cm water equivalent was found between the ground and potassium-airborne results, whereas a deviation of 1.7 cm water equivalent was calculated between data from the ground and those from the total radioactivity information.

Soil moisture corrections from measurements at selected sites were found to decrease the calculated snow-water equivalent an average of 1.7 cm. Errors in the soil moisture measurements and background variations encountered along the flight lines were found to be more important than statistical errors.

CHARACTERISTICS OF THE BREEDING FAILURE OF A
COLONY OF HERRING GULLS ON LAKE ONTARIO
M. Gilbertson
(IFYGL Project 103BC)

In 1972, an extensive study was undertaken on the distribution and severity of reproductive failures in colonies of Herring Gulls (*Larus argentatus*) on the lower Great Lakes (Gilbertson 1974). The 1972 study showed that the failure of the Herring Gulls was related to their contamination with organochlorine substances and further, that there was an inverse relationship between DDE and eggshell thickness. Colonies on Lake Ontario had the thinnest eggshells, the highest residues, and raised very few fledged young. The Herring Gull was shown to be a valuable monitor species in the Great Lakes since the residues accumulated by the adult birds appear to reflect those in the local environment. The Great Lakes environment appears to be the most polluted environment from a toxicological standpoint in Canada and thus measurement of the severity of the biological effects caused by toxicants can aid in the assessment of the present condition of the different lakes.

SIMULATED OUTFALL DIFFUSION EXPERIMENTS IN COASTAL CURRENTS OF A LAKE

C.R. Murthy
(IFYGL Project 89WM)

Sewage outfalls and other discharge outlets are usually located at lake or ocean floor at some distance offshore (usually 1-2 km from the shoreline). These outfalls are generally long diffusers with multiport nozzles and placed perpendicular to the shoreline. After the initial jet-mixing, which takes place within a short distance from the outlets, the effluents effectively form a line source. Further diffusion of this line source of effluents is governed by the prevailing coastal currents and their eddies. In spite of this widely accepted practice of disposing effluents using submarine outfalls in the near-shore areas of lakes and oceans, very little is known of the diffusion characteristics of effluents discharged at depth. An important question is how the effluents discharged at depth diffuse, when there are no significant dynamical effects due to initial momentum and/or buoyancy. Of particular interest is the case when a thermocline is interposed between the outfall source and the free surface. Under certain conditions during summer, it is likely that the effluents may be trapped below the thermocline.

In this paper, a practical method to conduct simulated outfall experiments, as well as some interesting results on the horizontal and vertical diffusion characteristics in hypolimnion coastal waters, are described. Rhodamine B dye solution preadjusted to a specific gravity of 1.0 was released in the coastal zone off Oshawa, Lake Ontario, in 20 m deep water, 3 m from the lake floor, from a 10 m long simulated outfall diffuser placed horizontally. The submerged dye plume so generated was surveyed fluorometrically by towing sampling booms at different depths.

SULPHATE DEPOSITION BY PRECIPITATION
INTO LAKE ONTARIO

R.W. Shaw and D.M. Whelpdale
(IFYGL Project 107BL)

Measurements of sulphate concentration in precipitation from individual snow storms of several hours duration in the Western Lake Ontario region indicate that approximately $9-66 \text{ mg m}^{-2}$ of SO_4 is being deposited into the Lake per storm. This amount is up to several times more than daily average values over long periods found by other workers. Using a mean sulphate concentration of 4 mg l^{-1} and an annual accumulation of precipitation of 760 mm, the yearly sulphate deposition by precipitation is about 0.1% of the total mass of sulphate in the Lake; however, more significantly, it is of the same order of magnitude as that discharged directly into the Lake by industry.

A HYDROLOGIC MODEL OF THE
LAKE ONTARIO LOCAL DRAINAGE BASIN

D.F. Witherspoon
(IFYGL Project 11TW)

A hydrologic model based on the water and energy balances is proposed for the Lake Ontario local drainage basin (27,100 square miles, comprising

the entire local contributing area except for the lake's water surface area of 7,500 square miles). Using a hypothesis which provides estimates of the actual regional evaporation, regional moisture values are obtained which, when routed, simulate the measured monthly outflows from the land area. The model provides a means for studying the hydrology of the basin, simulation of long periods of record and basic relationships which can be used in developing forecasting techniques. Further development of the techniques used is continuing with a view to wider application of the model.

UNITED STATES

Editors

Fred Jenkins and
May Laughrun

Typing

Ann Hanks

COMMENTS BY THE U.S. DIRECTOR

The U.S. IFYGL schedule (fig. 1) indicates that during the period covered by this issue of the Bulletin (October 1 to December 31, 1974) the data management activity is nearing completion and the analysis is well along. In fact, many of the analytical tasks have been completed, and final reports are being prepared or have been submitted to sponsoring agencies and/or placed in the IFYGL Archive.

An updated list of the contents of the IFYGL Archive at the National Climatic Center (NCC) is contained in the Data Management section of each issue of the Bulletin starting with No. 11.

In November 1974, W. T. Hodge replaced L. D. Dury as the U.S. IFYGL Data Manager. Dave Dury has moved on to a new assignment for CEDDA, but we will long remember, with appreciation, his efforts to make order out of chaos during and after the field operations. The new U.S. IFYGL Data Manager's address and phone numbers are:

W. T. Hodge D5x1 (14744)
U.S. IFYGL Data Manager
National Climatic Center
Federal Building
Asheville, North Carolina 28801
FTS: (704) 254-0216
Commercial: (704) 258-2850, ext. 216

Questions pertaining to editing and processing of data preparatory to archiving should be addressed to:

J. Foreman D2x1
CEDDA, EDS
National Oceanic and Atmospheric
Administration
Washington, D.C. 20235
Telephone: (202) 634-7344

Among several items of general interest resulting from the 19th Meeting of the IFYGL Joint Management Team, February 13, 1975, are:

- (1) No special IFYGL proceedings will be prepared of the 17th Conference on Great Lakes Research held in Hamilton, Ontario, August 12-14, 1974.
- (2) A 2- to 3-day Symposium is tentatively planned for the latter half of 1977 to provide a wrap-up for IFYGL. Questions worthy of consideration in each major project include the following: What have we learned? What mistakes were made? Was it useful? Where to from here?

Suggestions on any aspect of IFYGL would be appreciated by the U.S. IFYGL Project Office.

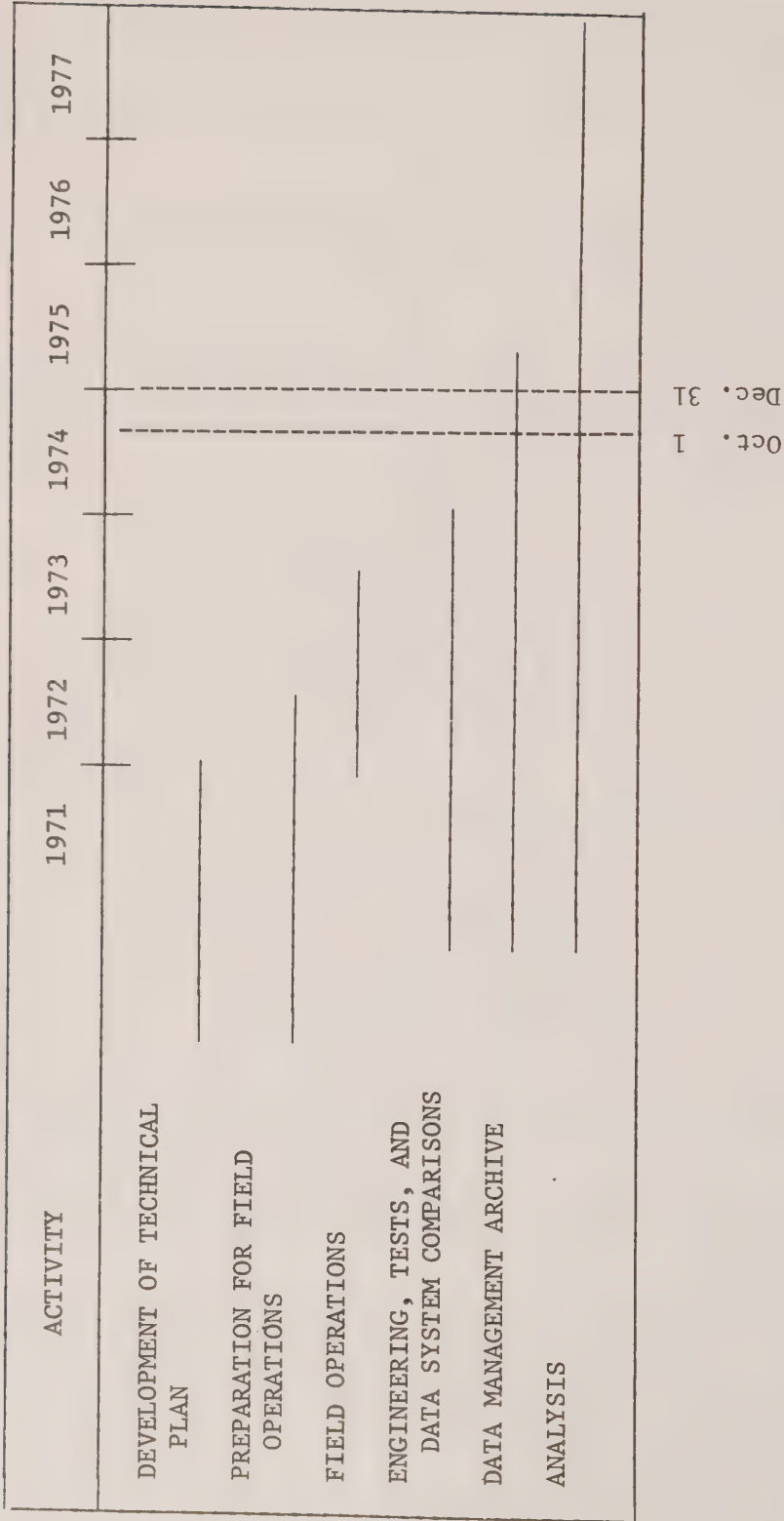


Figure 1.--U.S. IFYGL schedule.

U.S. SCIENTIFIC PROGRAM

Based upon reports requested by the U.S. IFYGL Project Office, the progress from October 1 through December 31, 1974, is presented for each of the U.S. IFYGL tasks. Some reports cover work done in January 1975.

Panel activity status reports follow the task reports.

Tasks

1. *Phosphorus Release and Uptake by Lake Ontario Sediments*

Principal Investigators: D. E. Armstrong and R. F. Harris -
University of Wisconsin.

Task completed.

2. *Net Radiation*

Principal Investigator: M. A. Atwater - CEM

The final report on this task was submitted to the U.S. IFYGL Project Office. Several methods for computing spatial averages of cloud amount and radiative fluxes are discussed in the report. Daily, weekly, and seasonal variations in time and space are also described.

A data tape was forwarded to the IFYGL Archive at NCC. It contains the following:

- (1) tape descriptors;
- (2) radiative heating rates from 0000 GMT, September 17, 1972, to 1200 GMT, December 12, 1972, integrated over 3 hr; and
- (3) daily radiation fluxes and cloud cover at each of 30 grid points, and lake averages for each day of IFYGL.

The numerical model used to compute the radiation budget for Lake Ontario during IFYGL yields cloud analyses at three levels from meteorological data at stations surrounding Lake Ontario and from IFYGL research ships. Vertical profiles of temperature and humidity are obtained from the Buffalo radiosonde data. A 30-point horizontal grid is used for calculating spatial averages of the radioactive fluxes and cloud amounts.

Statistical methods used to improve analyzed cloud amounts and to make up for missing data were unproductive. The specification of fog and of cloud amounts above a lower overcast layer were improved in the final cloud analysis.

The radiation model includes absorption and/or scattering by clouds, water vapor, carbon dioxide, ozone, aerosols, and additional minor constituents by use of empirical transmission functions. The computation of downward solar and infrared fluxes and of the net radiation flux were verified with observations from measurements at stations surrounding or on Lake Ontario. The observed fluxes compared favorably with computed fluxes over the lake.

The weekly averaged flux components and cloud amounts during IFYGL (without manual input of fog) are shown in figure 2. The weekly averages of net radiative fluxes, including spring fogs, and total cloud cover are shown in figure 3. This figure also shows the corresponding weekly averaged net radiative fluxes computed by Davies and Schertzer (1974)¹.

Computed seasonal variations of the lake-averaged net radiation fluxes and cloud cover are shown in table 1, and are compared with the results obtained by Davies and Schertzer. Figure 4 shows the yearly averaged computed spatial variation of net flux and cloud cover, and indicates a variation of 15 percent in net flux across the lake.

Hourly radiative heating rates over central Lake Ontario near the surface and at 50-mb intervals, starting at 950 mb, were computed for September 16 to December 11, 1972. Cloud layers were near 900, 700, and 450 mb. Generally, more negative heating rates were found at these levels, rather than at adjacent ones. Weekly averaged heating rates, starting at 0000 GMT, September 21, 1972, are shown in figure 5.

3. *RFF/DC-6 Boundary Layer Fluxes*

Principal Investigator: B. R. Bean - ERL/NOAA

The task work is completed, and the final report has been submitted to the U.S. IFYGL Project Office.

4. *Nitrogen Fixation*

Principal Investigator: R. Burris - University of Wisconsin

Task completed.

5. *Profile Mast and Tower Program*

Principal Investigator: J. A. Businger - University of Washington

¹ Davies, J.A., and W.M. Schertzer, "Canadian Radiation Measurements and Surface Radiation Balance for Lake Ontario During IFYGL," Final Report on IFYGL Project No. 71EB and 80EB, Report published for Department of the Environment, Canada Centre for Inland Waters, 1974, 77 pp.

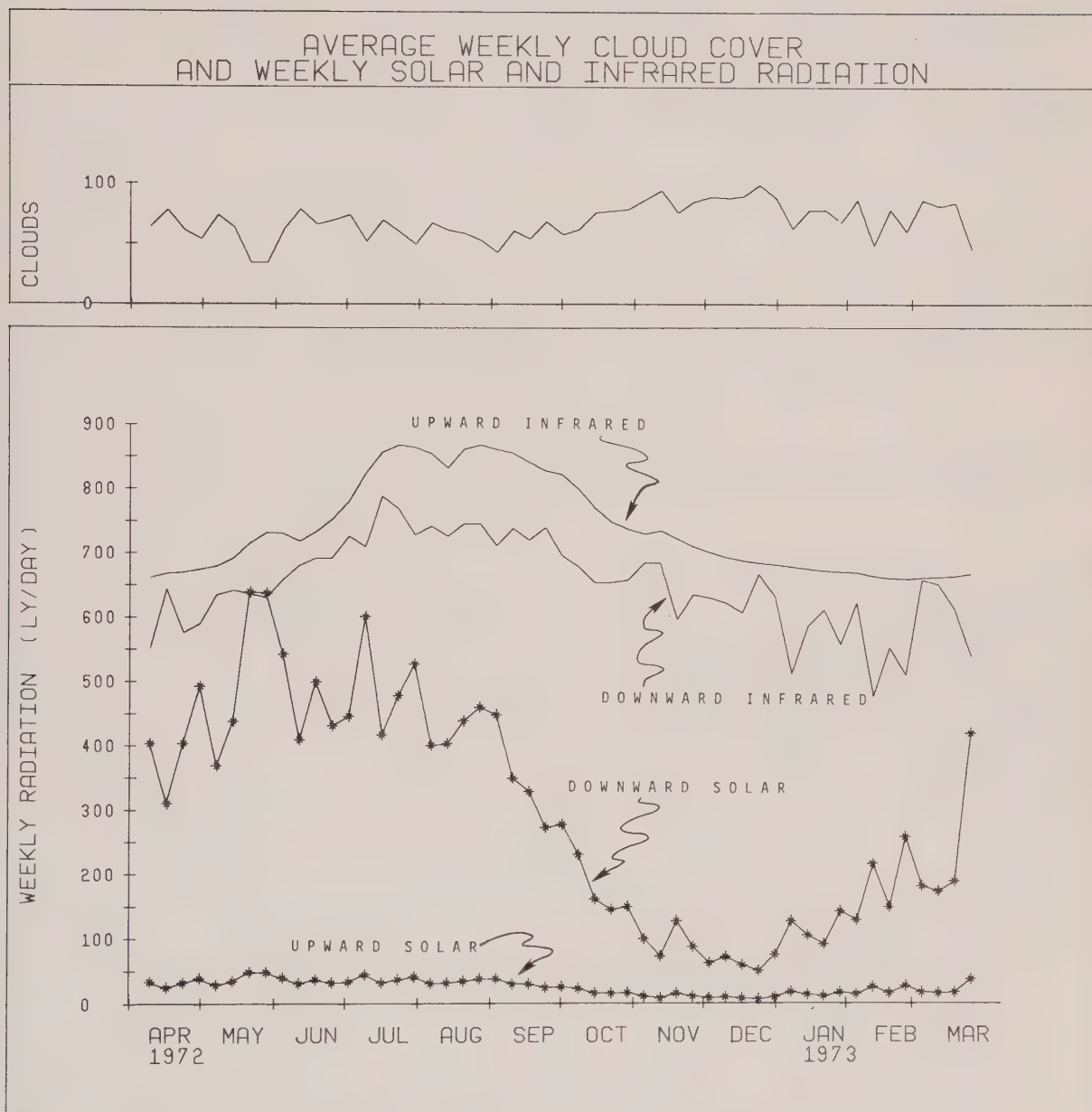


Figure 2.--Computed weekly averaged cloud cover and radiative flux components.

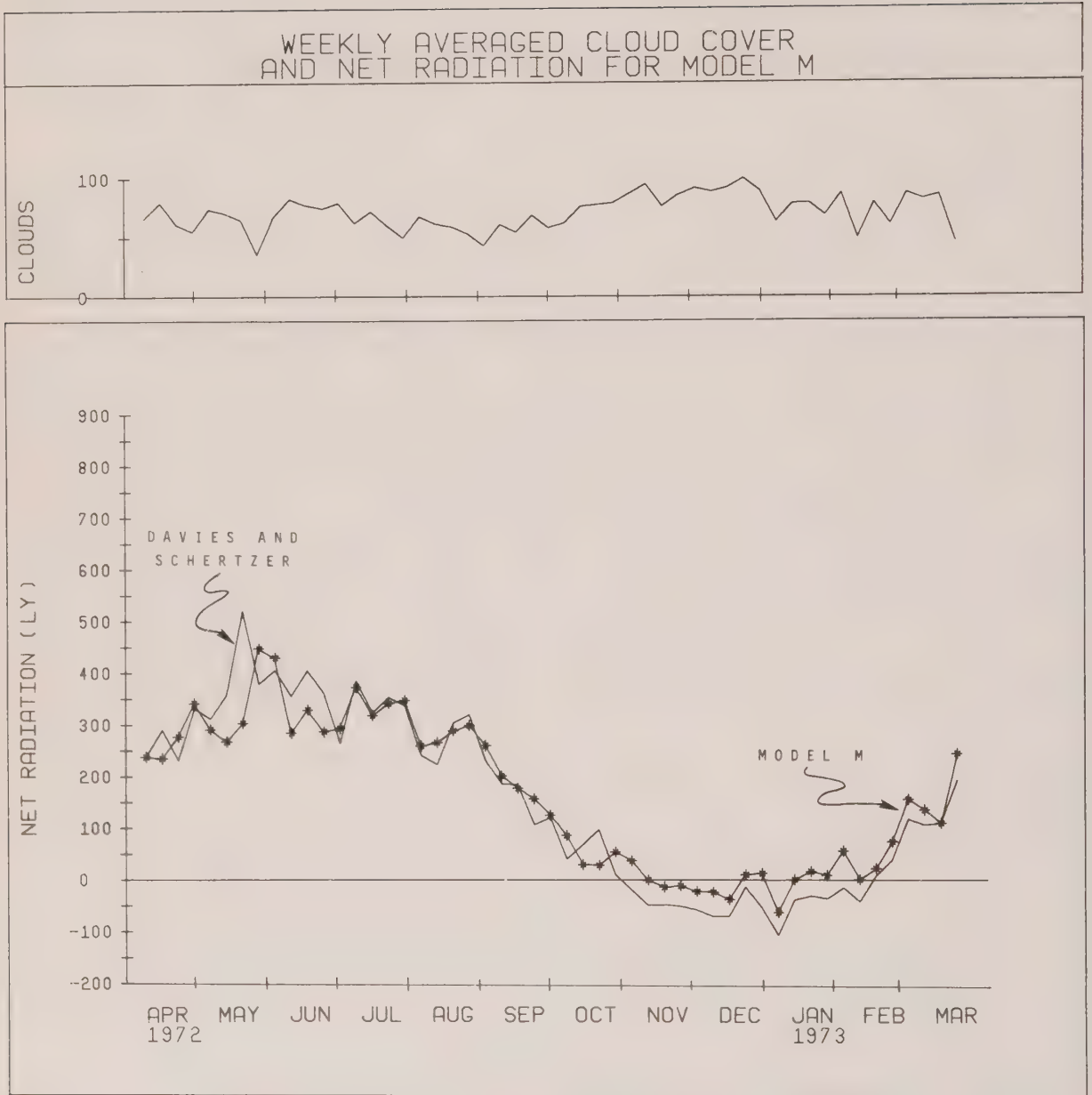


Figure 3.--Weekly and spatially averaged cloud cover, and net radiative flux from Model M and from Davies and Schertzer (1974).

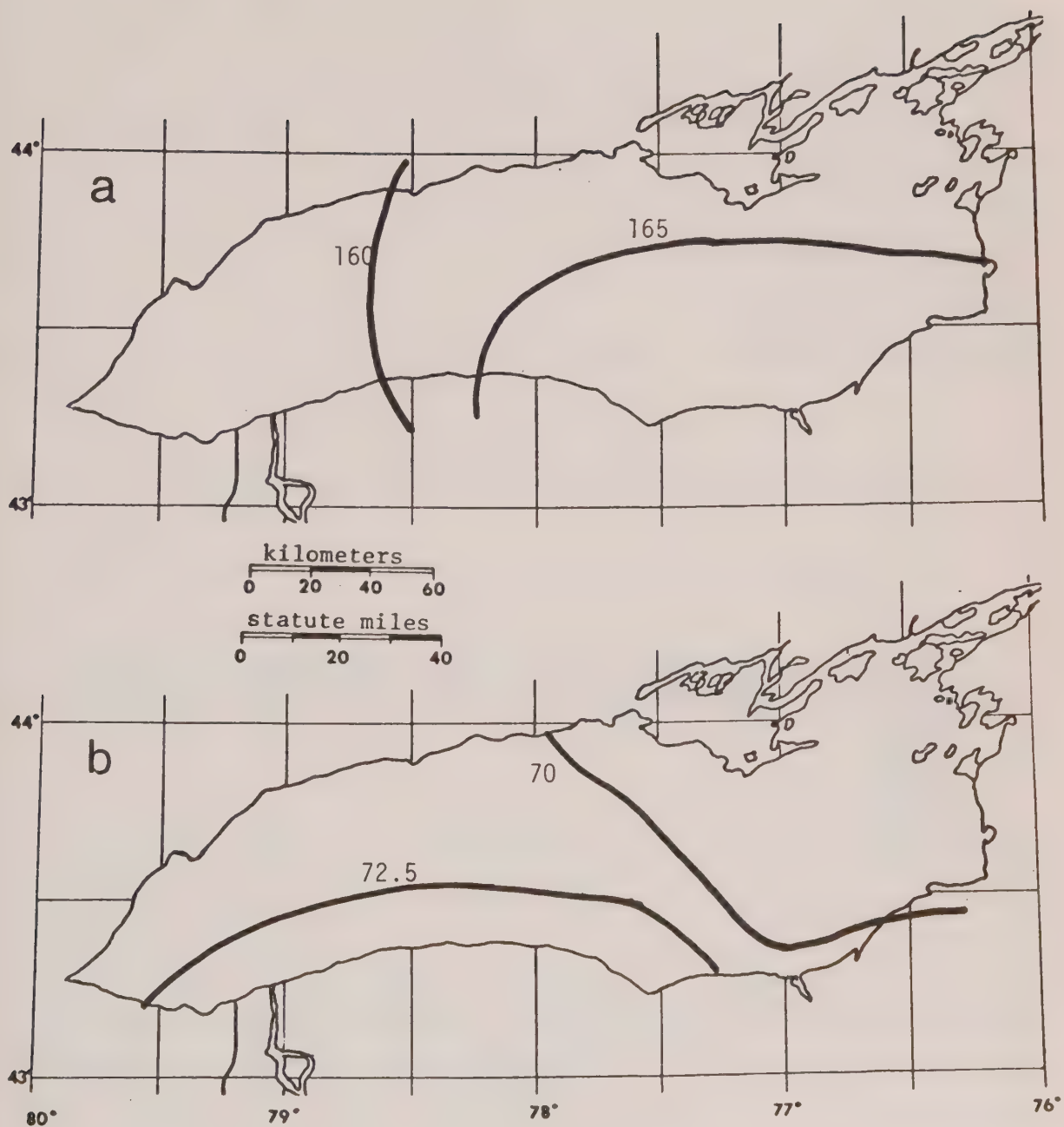


Figure 4.-- Yearly averaged (a) net radiative flux (ly/day) and (b) total cloud amount (percent) over Lake Ontario during IFYGL from Model M. The lake averages are 163 for (a) and 71 for (b).

Table 1.--Lake-averaged radiation fluxes and cloud cover

Period	Net radiation		Cloud cover (percent)
	Atwater	Davies and Schertzer (langley/day)	
April through June	301.0	332.7	68.2
July through September	270.6	262.6	60.0
October through December	17.6	- 16.4	82.8
January through February	64.2	51.8	72.7
Year	163.35	157.68	70.8

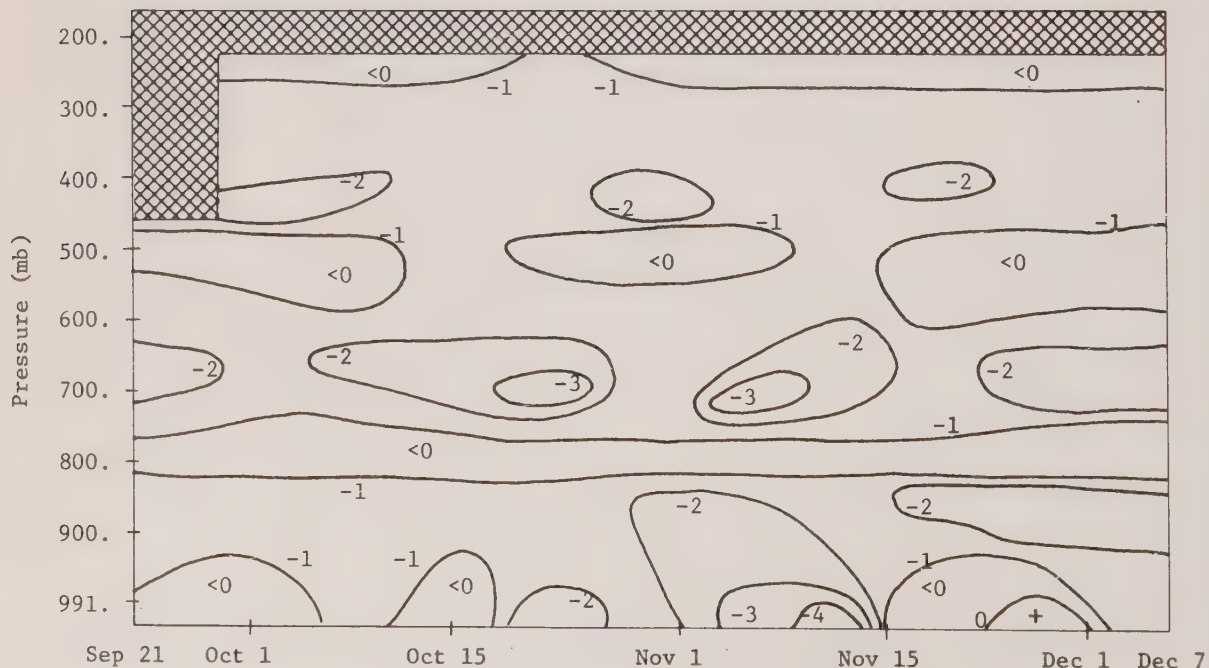


Figure 5.--Weekly averaged total radiative heating rates (°C/day) over central Lake Ontario.

We have completed computation of fluxes of momentum, sensible heat, and water vapor based on diabatic profile theories and measurements at our Cobourg, Ontario, site. The data consist of 70- to 50-min runs from 1306 GMT, October 12, to 1550 GMT, October 15, 1972. One set of flux values was computed for each run. Several runs have offshore wind directions giving boundary-layer modification. The profiles indicate that only our bottom three levels (those below 1.66 m) are in the fully modified region, and only these levels were therefore used in the flux computations. The measurements cover a period beginning shortly after the passage of one cold front, and continue through a cold-air outbreak from Canada onto Lake Ontario, the passage of a second front, and another cold-air outbreak.

A report on the above data, fluxes, and results is being prepared for the IFYGL Archive. An abbreviated version of the report will appear in the next issue of the IFYGL Bulletin.

6. *Status of Lake Ontario Fish Populations*

Principal Investigator: J. H. Kutkuhn - Great Lakes Fisheries Laboratory

The task work is completed, and a manuscript is in preparation.

7. *Material Balance of Lake Ontario*

Principal Investigator: D. J. Casey - EPA

No report.

8. *Runoff*

Principal Investigator: L. T. Schutze - U.S. Army Corps of Engineers

Work completed.

9. *Evaporation (Lake-Land)*

Principal Investigator: L. T. Schutze - U.S. Army Corps of Engineers

No work was done during this quarter.

10. *Simulation Studies and Analyses Associated With the Terrestrial Water Balance*

Principal Investigator: B. G. DeCooke - U.S. Army Corps of Engineers

Activity has not begun.

11. *Land Precipitation Data Analysis*

Principal Investigators: L. T. Schutze and R. Wilshaw - U.S. Army
Corps of Engineers

No activity during this quarter.

12. *Transport Processes Within the Rochester Embayment of Lake Ontario*

Principal Investigators: G. F. Bonham-Carter and J. H. Thomas -
University of Rochester

All the data recovered from the fixed grid of current and temperature meters maintained in the Rochester embayment during IFYGL have been processed and analyzed. "IFYGL Rochester Embayment Project Report No. 4," displaying all these data, as well as relevant wind data, is now available, and the processed data are stored in IFYGL Archive at NCC. The salient features of the data were reported by G. F. Bonham-Carter at the 17th Conference on Great Lakes Research in August 1974. Further interpretation of the data is underway.

Work on modeling wind-driven currents in Lake Ontario and the Rochester embayment is progressing. A theory of steady wind-driven currents in shallow water using a spatially variable eddy viscosity was presented by J. H. Thomas in Journal of Physical Oceanography, Vol. 5, 1975, pp. 136-142. Witten has developed a slightly different formulation for his Ph.D. dissertation, now in preparation, and has gone on to calculate detailed results for currents in Lake Ontario.

Theoretical work on the coastal boundary layer and on the ordering of time scales of the response of the lake to a sudden wind stress is being done by A. Clark, Jr., R. D. Whiting, and M. Zaki.

13. *Soil Moisture and Snow Hydrology*

Principal Investigator: W. N. Embree - U.S. Geological Survey

The final report is being prepared.

14. *Boundary Layer Structure and Mesoscale Circulation*

Principal Investigator: M. A. Estoque - University of Miami

See Task 15 below.

15. *Mesoscale Simulation Studies*

Principal Investigator: M. A. Estoque - University of Miami

An analysis of the structure of the lake breeze is almost complete for the period October 2 to 5, 1972, which was characterized by success-

ive daily lake breezes over the southern shores of Lake Ontario. A report on this study will be written.

The results of the numerical integrations of the lake-breeze two-dimensional model have also been analyzed. The integrations represent a simulation of the lake breeze on October 3, 1972, near Rochester, N. Y. This work is also almost complete, and a report will be prepared. Work will continue during next quarter on the three-dimensional model and the analysis of observations from stations other than those within our own network.

16. *Water Transfer Across Large Lake*

Principal Investigator: H. W. Stoughton - State University of New York at Alfred

Retabulation of Lake Ontario precise level line was completed, and 5-min United States water-level data are available.

17. *Nearshore Ice Formation, Growth, and Decay*

Principal Investigator: J. Dilley² - General Electric Company

No activity during this period.

18. *Advection Term - Energy Balance*

Principal Investigator: J. Grumblatt - GLERL/NOAA

The transfer of the staff on this task from the Lake Survey Center (LSC) to GLERL necessitated a change in computers. New computer programs are being developed; existing data files will be recompiled on disk pack. Additional tributary streamflow data have been received for the Genesee, Oswego, and Black Rivers and are being added to the data file for analysis.

19. *Occurrence and Transport of Nutrients and Hazardous Polluting Substances in the Genesee River Basin*

Principal Investigator: L. J. Hetling - New York State Department of Environmental Conservation

Task completed.

20. *Boundary Layer Flux Synthesis*

Principal Investigators: J. A. Almazan and J. K. S. Ching - CEDDA/NOAA

Work continued on preparing (1) monthly statistical summaries, consisting of means and standard deviations, of 1972 meteorological data from

²A. Pavlak is no longer affiliated with this task.

selected buoys; and (2) monthly summaries showing cross-correlation variances and cross-products of the meteorological variables. Samples of these were presented at a workshop in Ann Arbor, Mich., in October 1974, and it was proposed that these summaries be used for an IFYGL atlas.

Comparison of the United States and Canadian meteorological data from the collocated buoys is complete, and a report has been prepared in draft form. The data cover one period in July and another in October 1972.

21. *Hazardous Material Flow*

Principal Investigator: T. Davies - EPA

Work on the final report is continuing.

22. *Remote Measurement of Chlorophyll With Lidar Fluorescent System*

Principal Investigator: H. H. Kim - NASA

Task completed.

23. *Inflow/Outflow Term - Terrestrial Water Budget*

Principal Investigator: P. L. Cox - U.S. Army Corps of Engineers

Task completed.

24. *Use of an Unsteady State Flow Model to Compute Continuous Flow*

Principal Investigator: P. L. Cox - U.S. Army Corps of Engineers

No activity during this quarter.

25. *Radiant Power, Temperature, and Water Vapor Profiles Over Lake Ontario*

Principal Investigator: P. M. Kuhn - ERL/NOAA

Work completed.

26. *Algal Nutrient Availability and Limitation in Lake Ontario*

Principal Investigator: G. F. Lee - University of Texas at Dallas

No report.

27. *Wave Studies*

Principal Investigator: P. C. Liu - GLERL/NOAA

Detailed analyses of wave spectra continued. An inventory has been started of IFYGL wind, air-temperature, and water-temperature data in terms

of availability and applicability to wave studies. A comparative study of IFYGL wave recordings and ship-reported wave data is underway.

The paper on "Duration-Limited Wave Spectra in Lake Ontario During the 1972 Hurricane Agnes," presented at the 17th Conference on Great Lakes Research in August 1974, has been accepted for publication in the Conference Proceedings.

28. *Cloud Climatology*

Principal Investigator: W. A. Lyons - University of Wisconsin,
Milwaukee

No report.

29. *Zooplankton Production in Lake Ontario as Influenced by Environmental Perturbations*

Principal Investigator: D. C. McNaught - State University of New
York at Albany

Task completed.

30. *Change in Lake Storage Term - Terrestrial Water Budget*

Principal Investigator: R. Wilshaw - U.S. Army Corps of Engineers

No activity during this quarter.

31. *Soil Moisture*

Principal Investigator: L. T. Schutze - U.S. Army Corps of Engineers

Work not yet begun.

32. *Testing of COE (Corps of Engineers) Lake Levels Model*

Principal Investigator: E. Megerian - U.S. Army Corps of Engineers

This task has been canceled.

33. *Nearshore Study of Eastern Lake Ontario*

Principal Investigator: R. B. Moore - State University of New York
at Oswego

Task completed.

34. *Internal Waves - Transects Program - Interpretation of Whole-Basin Oscillations*

Principal Investigator: C. H. Mortimer - University of Wisconsin, Milwaukee

To enable completion of this project, a full-time specialist, David J. Schwab, has been appointed as of January 1, 1975.

Current activity consists of painstaking comparison of the plotted transect isotherms with all "contemporary" temperature readings from the Canadian and United States coastal chain surveys, fixed buoys, towers, and thermistor chains located on or at the ends of the following transects: Braddock Point to Presqu'ile and Oswego to Prince Edward Island, July 24 to 28, August 7 to 11, and October 2 to 6, 1972. "Contemporary" is defined as either the 6-min (United States) or 10-min (Canadian) reading at the time the transecting vessel passed that particular station, or those coastal chain surveys for which one portion fell within 1 hr of a transect passage.

35. *Pontoporeia affinis and Other Benthos in Lake Ontario*

Principal Investigator: S. C. Mosley - University of Michigan

No report.

36. *Pan Evaporation Project*

Principal Investigators: C. N. Hoffeditz - NWS/NOAA and J. A. W. McCulloch - AES, Canada

No report.

37. *Simulation Studies and Other Analyses Associated With U.S. Water Movements Projects*

Principal Investigators: J. P. Pandolfo and C. A. Jacobs - CEM

Task completed.

38. *Structure of Turbulence*

Principal Investigator: H. A. Panofsky - Pennsylvania State University

Task completed.

39. *Airborne Snow Reconnaissance*

Principal Investigator: E. L. Peck - NWS/NOAA

No activity during this quarter.

40. *Optical Properties of Lake Ontario*

Principal Investigator: K. R. Piech - Calspan Corporation

No report.

41. *Storage Term - Energy Balance Program*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

Main efforts were spent on computer program modifications. Further work on this task awaits availability of shipboard physical data.

42. *Sensible and Latent Heat Flux*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

The analysis routine was reexamined after review of relevant Canadian boundary layer analysis. Further work depends on availability of shipboard physical data.

43. *Thermal Characteristics of Lake Ontario and Advection Within the Lake*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

Computer program modifications continued. Further work depends on availability of shipboard physical data.

44. *Oswego Harbor Studies*

Principal Investigator: G. L. Bell - GLERL/NOAA

The characteristics of the river water have been summarized, and mean values for the various constituents at stations 1, 2, and 3, near the river mouth, are given in table 2. Specific conductance measurements during 18 days, when the river flow and temperature varied, show that the maximum values were recorded at station 3 (61 percent of the time as compared with only 28 percent at station 1), indicating local input downstream from station 1. Dilution of the river water near the mouth during this same period is evidenced by the minimum value 83 percent of the time at station 4. (For location of these stations, see IFYGL Bulletin No. 9.)

Target date for the final report is June 1975.

Table 2.--Characteristics of Oswego River water:
grand mean for all cruises

Constituent	Stations		
	1	2	3
Nitrate (mg/l)	0.61	0.73	0.75
Phosphate (mg/l)	0.127	0.131	0.153
Sulfate (mg/l)	60	64	57
Silica (mg/l)	1.2	1.7	1.3
Calcium (mg/l)	77.1	78.2	69.8
Magnesium (mg/l)	10.6	10.9	10.2
Sodium (mg/l)	65.3	63.6	55.1
Potassium (mg/l)	2.85	2.95	2.62
Chloride (mg/l)	158.9	147.3	126.2
Phenolphthalein alkalinity (mg/l)	0.5	0.6	0.4
Total alkalinity (mg/l)	115	117	113
Dissolved oxygen (mg/l)	9.78	10.87	9.52
Dissolved oxygen (percent)	100	103	96
Specific conductance (μ mhos)	873	881	774
pH	8.05	7.99	8.03
Eh (V)	0.152	0.147	0.153

45. *Mapping of Standing Water and Terrain Conditions With Remote Sensor Data*

Principal Investigator: F. C. Polcyn - ERIM

Task completed.

46. *Remote Sensing Program for the Determination of Cladophora Distribution*

Principal Investigators: F. C. Polcyn and C. T. Wezernak - ERIM

Task completed.

47. *Remote Sensing Study of Suspended Inputs Into Lake Ontario*

Principal Investigators: F. C. Polcyn and C. T. Wezernak - ERIM

Task completed.

48. *Island-Land Precipitation Data Analysis*

Principal Investigator: F. H. Quinn - GLERL/NOAA

The report on overland precipitation in the U.S. portion of the basin is complete and under final review. First-cut overwater precipitation estimates

derived by a Thiessen polygon procedure are nearly complete. Tabulation of data for the island precipitation network in eastern Lake Ontario continued. Review of precipitation data from the towers and land stations was begun.

49. *Lake Circulation, Including Internal Waves and Storm Surges*

Principal Investigator: D. B. Rao - GLERL/NOAA³

A storm-surge model for Lake Ontario was developed based on the normal-mode expansion procedure. The two-dimensional normal modes with the topography of the lake and the earth's rotation taken into account were determined numerically, and these calculations are described in "Two-Dimensional Normal Modes in Arbitrary Enclosed Basins on a Rotating Earth: Application to Lakes Ontario and Superior," Special Report No. 19, Center for Great Lakes Studies, University of Wisconsin, Milwaukee. Comparison of water levels predicted by means of normal modes with those obtained via finite-difference methods (in space) shows very good agreement. Further, the normal-mode procedure is much faster. A report on this work is being prepared.

A time-dependent, linear two-layer model of Lake Ontario was integrated for 96 hr for different hypothetical wind stresses. In this model, the bathymetry of the lake and the earth's rotation are considered, and the shape of the lake is replaced by a closest fitting rectangle. A detailed report is being prepared on the results, which indicate that for uniform westerly-winds the lower layer circulation exhibits cyclonic gyres, qualitatively in agreement with R. L. Pickett's analysis of the IFYGL current-meter data for July 1972 (unpublished).

50. *Atmospheric Water Balance*

Principal Investigator: E. M. Rasmusson - CEDDA/NOAA

The asymptotic singular decomposition (ASD) method for fitting the basic fields in scientific computations has provided an unexpected bonus in data checking. It easily pointed out six erroneous soundings in the second intensive period (October 30 to November 14, 1972), and will now be used in a final validation check of observations during periods 1 and 3 (October 2 to 18 and November 21 to December 10). This practical application has been described in an internal memorandum.

Fifty manually worked up soundings and the same soundings processed from magnetic tape with finer time intervals were compared. A small, but statistically non-zero difference, was found in both humidity and temperature. Because of the smallness of the error and its statistical nature, no further corrections were applied to the manual soundings. This work is also documented in an internal memorandum.

³D.B. Rao is now with NOAA's Great Lakes Research Laboratory (GLERL) in Ann Arbor, Mich.

Data obtained during 16 days for all six rawinsonde stations during instrument descent were compared with ascent data for the same soundings. Certain consistent features emerged, e.g., temperatures were warmer during ascent than during descent, except through inversions. So far, there appear to be three reasons for differences in the two parts of the sounding:

- (1) Baroswitch hysteresis error.
- (2) Thermal lag effects in opposite directions.
- (3) Balloon drift (spatial separation).

The results will be presented at the June 1975 meeting of the American Geophysical Union.

The mass divergence for the 16 days from October 30 to November 14, 1972, was computed with the ASD method. The water-balance parameter E-P (evaporation minus precipitation) was also computed for the same period. It was established that subgrid-scale fluxes can be neglected in these calculations if the top of the layer of interest is 500 mb or more above the surface. These results will be summarized at the 18th Conference on Great Lakes Research in May 1975 in Albany, N. Y.

Preliminary water-budget calculations for intensive periods 1 and 3 are underway, and heat budget computations for period 2 will be carried out during the next quarter.

51. *Evaporation Synthesis*

Principal Investigator: F. H. Quinn - GLERL/NOAA

A meeting was held on November 11, 1974, to discuss progress and scheduling by the various groups that are to provide input for this task. Generation of first-cut evaporation data continues.

52. *Groundwater Flux and Storage*

Principal Investigator: E. C. Rhodehamel - U.S. Geological Survey

Task completed.

53. *Spring Algal Bloom*

Principal Investigator: A. Robertson - GLERL/NOAA

Work on this task has not begun.

54. *Ice Studies for Storage Term - Energy Balance*

Principal Investigator: F. H. Quinn - GLERL/NOAA

Task completed.

55. *Lagrangian Current Observations*

Principal Investigator: J. H. Saylor - GLERL/NOAA

Preparation of final project reports presenting results of the Lagrangian experiments is continuing.

56. *Circulation of Lake Ontario*

Principal Investigator: J. H. Saylor - GLERL/NOAA

Comparison of Lagrangian current measurements and currents measured at moored buoys with current meters is continuing. The spatial scale of coherent current motions varies greatly with the season of the year and with the water-density distribution in the lake basin.

57. *Phytoplankton Nutrient Bioassays in the Great Lakes*

Principal Investigator: C. Schelske - University of Michigan

Task not activated.

58. *Runoff Term of Terrestrial Water Budget*

Principal Investigator: G. K. Schultz - U.S. Geological Survey

Task completed.

59. *Coastal Chain Program*

Principal Investigator: J. T. Scott - State University of New York
at Albany

A program has been developed for calculating daily current "roses" and resultants for each coastal chain line at prescribed depths. Daily measured and baroclinic geostrophic transport values have been plotted on maps of Lake Ontario for selected events to show daily variation in circulation patterns.

A paper by D. R. Landsberg and J. T. Scott entitled "On the Circulation in Lake Ontario" was accepted for presentation at the 18th Conference on Great Lakes Research in May 1975 in Albany, N. Y.

Plans for the next quarter are to (1) run our current rose program for all United States and Canadian coastal-chain data; (2) begin averaging our

data for selected events for future reports, and to continue working with two geographers to make these reports more useful to the public; and (3) construct daily maps showing fastest currents at each coastal chain as an aid in tracing the movements of waves around the lake after a storm passage.

60. *Analysis of Phytoplankton Composition and Abundance*

Principal Investigator: E. F. Stoermer - University of Michigan

Task completed.

61. *Clouds, Ice, and Surface Temperature*

Principal Investigator: A. E. Strong - NESS/NOAA

No report.

62. *Analysis and Model of the Impact of Discharges from the Niagara and Genesee Rivers on Nearshore Biology and Chemistry*

Principal Investigator: R. A. Sweeney - State University of New York at Buffalo

Task completed.

63. *NCAR/DRI - Buffalo Program*

Principal Investigator: J. W. Telford - Desert Research Institute, University of Nevada

No report.

64. *Mathematical Modeling of Eutrophication of Large Lakes*

Principal Investigator: R. V. Thomann - Manhattan College

No report.

65. *Cladophora Nutrient Bioassay*

Principal Investigator: G. F. Lee - University of Texas at Dallas

Inactive.

66. *Sediment Oxygen Demand*

Principal Investigator: N. A. Thomas - EPA

Dissolved oxygen profiles obtained from the Researcher have been analyzed and are being compared with values obtained with the chamber. The dissolved oxygen profiles indicate areas of moderate oxygen depletion. A

paper relating the sediment oxygen profiles to the chamber measurements will be presented at the 18th Conference on Great Lakes Research in May.

67. *Main Lake Macrobenthos*

Principal Investigator: N. A. Thomas - EPA

A report on the benthos of Lake Ontario is being prepared for an EPA ecological series report. Drafts should be available in July 1975.

68. *Exploration of Halogenated Hazardous Chemicals in Lake Ontario*

Principal Investigators: G. F. Lee - University of Texas at Dallas
and C. L. Haile - University of Wisconsin

Task completed.

69. *Basin Precipitation - Land and Lake*

Principal Investigator: J. W. Wilson - CEM

An error was discovered in the objective analysis program (ANL2) used in deriving daily precipitation totals for the basin from the rain-gage measurements. Examination of the individual daily rain-gage reports for the Field Year showed the most frequent error to be a result of the gages not having been read at the specified time and missing data having been reported as "no precipitation." Based on this examination, reports from an average of 10 to 15 gages per day were deleted, and after these corrections the program was rerun.

Empirical range correction curves that vary with precipitation type and freezing level height were determined for the Oswego radar, and the curves were then used to derive adjusted daily precipitation totals from the entire Oswego radar sample. Preparations are being made for deriving the range correction curves for the Buffalo radar.

The adjusted daily radar precipitation totals for the Oswego radar for the Field Year at a grid spacing of 3.5 mi were corrected by means of rain-gage measurements. This was done by multiplying the adjusted radar precipitation totals for each day by a correction field determined from an objective analysis of the ratio between the gage and radar totals. Comparisons were made between the gage-corrected radar amounts and precipitation measurements from the Oswego snow network and the Rochester rain-gage network (which were not used in correcting the radar precipitation totals). Preliminary results are very encouraging, the radar estimates over the Oswego snow network being particularly good.

A paper on "Measurement of Snowfall by Radar During the IFYGL" was prepared for the 16th Radar Meteorology Conference in April 1975.

70. *Evaluation of ERTS Data for Certain Hydrological Uses*

Principal Investigators: D. R. Wiesnet and D. F. McGinnis - NESS/NOAA

No report.

71. *Distribution, Abundance, and Composition of Invertebrate Fish Forage Mechanisms in Lake Ontario*

Principal Investigator: J. H. Kutkuhn - Great Lakes Fisheries Laboratory

The task work is completed, and a manuscript is in preparation.

72. *Coastal Circulation in the Great Lakes*

Principal Investigator: G. T. Csanady - Woods Hole Oceanographic Institution

No report.

73. *Lake Water Characteristics*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

Coordination with Task 7 is needed before additional progress can be anticipated.

74. *Snow Observation Network*

Principal Investigator: Robert B. Sykes, Jr. - State University of New York at Oswego

Task completed.

75. *Lake Circulation Model*

Principal Investigator: J. R. Bennett - MIT

No report.

76. *Lake Ontario Invertebrate Fauna List*

Principal Investigator: A. Robertson - GLERL

Task was inactive during this quarter.

77. *Distribution and Variability of Physical Lake Properties*

Principal Investigator: R. Pickett - GLERL/NOAA

Editing of the United States and Canadian buoy and tower air-temperature, water-temperature, air-pressure, wind, and current data for the entire Field Year is complete. The data are being sent to other investigators, and analysis is underway.

Plots of some of the edited data are shown in figures 6 and 7. In figure 6, daily mean windspeed, averaged over the whole buoy and tower network, is plotted for each day. In autumn, winds increased and storms were more intense, with daily mean speed reaching 10 m s^{-1} on October 9, 1972. By contrast, Hurricane Agnes, on June 23, brought a daily mean of only 7.5 m s^{-1} . Figure 7 shows air and lake temperatures over the network. The lake surface temperature was obviously less variable than the air temperature. In spring, the air was about 4°C warmer than the lake surface, but by the end of July the lake surface temperature had caught up. In August, an unseasonably cold month in 1972, both the air and the lake temperature dropped by more than 6°C . By late September, the air temperature dropped below the lake surface temperature and stayed there until the recordings were discontinued.

78. *Carbon Cycle Model*

Principal Investigators: A. Robertson and B. Eadie - GLERL/NOAA

Development of a model of Lake Ontario carbon flow is proceeding on schedule. The mathematical structure has been established for most of the compartments, and calibration is progressing satisfactorily.

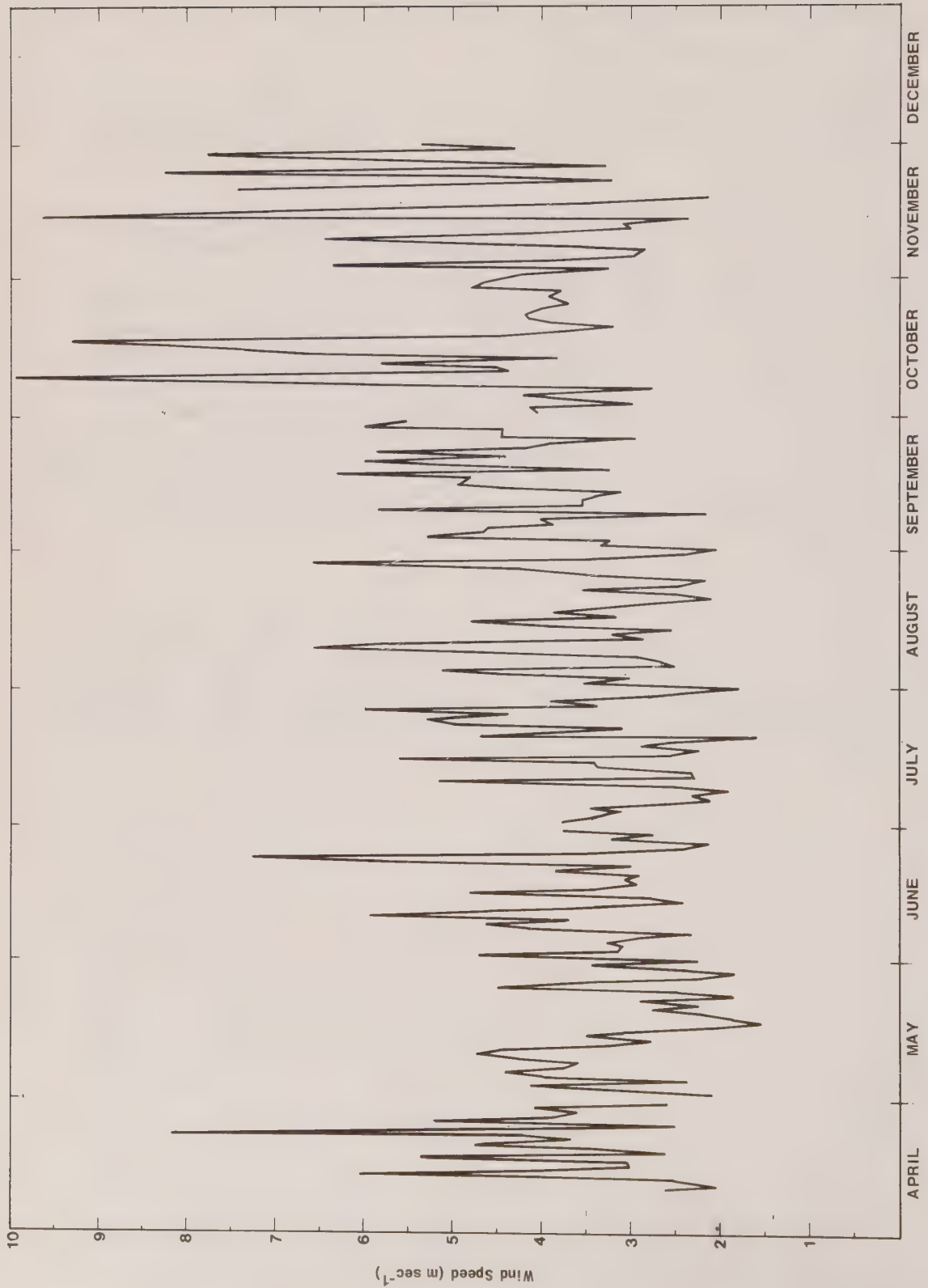


Figure 6. ---Daily mean surface windspeed over Lake Ontario in 1971.

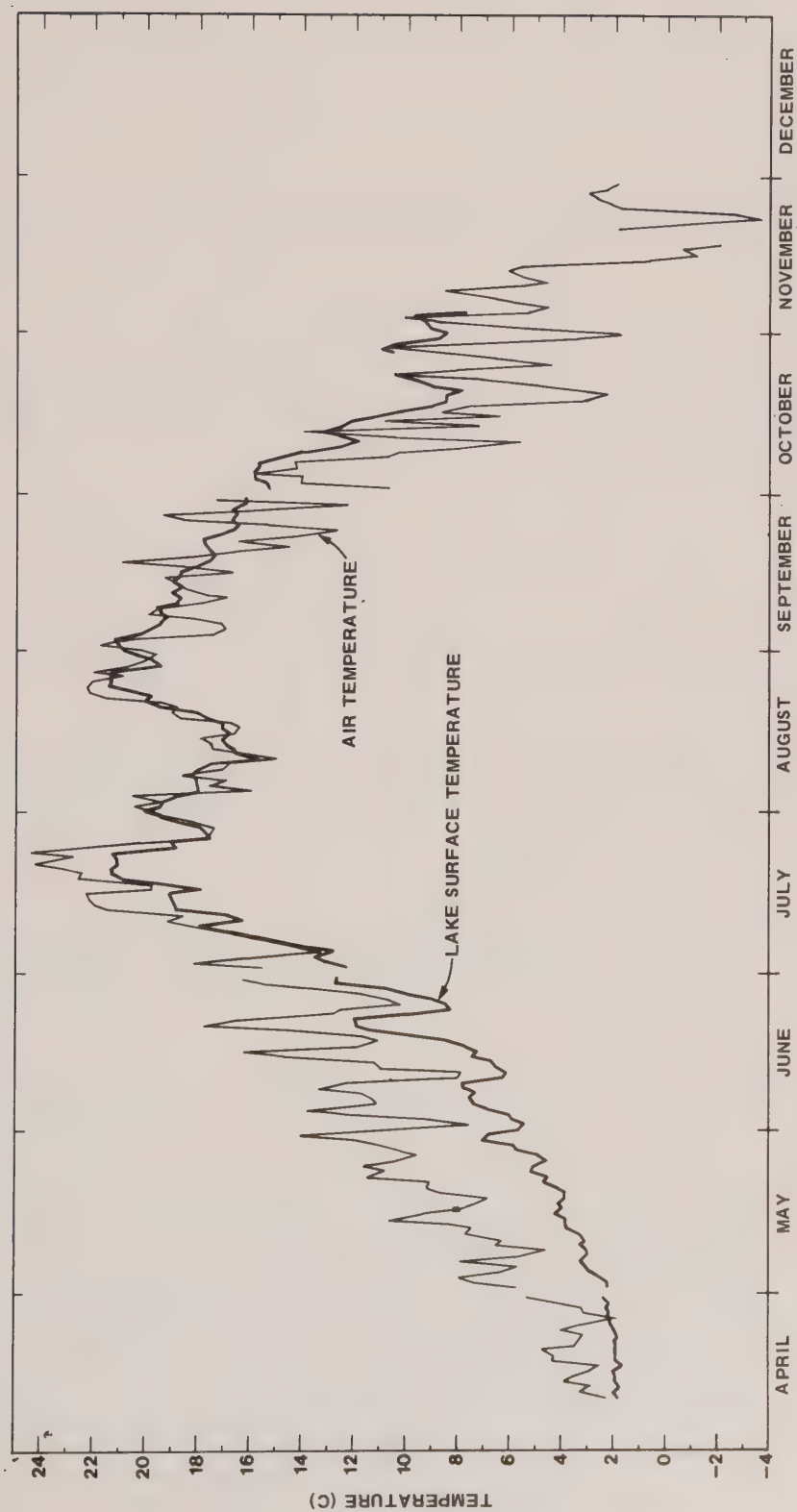


Figure 7. --Daily mean air and lake surface temperature at Lake Ontario in 1972.

Panel Reports

Biology and Chemistry - N. A. Thomas, U.S. Panel Cochairman

Reports are being published for several IFYGL tasks supported by EPA. Copies can be obtained from either the principal investigators or the EPA Grosse Ile Laboratory.

Boundary Layer - J. Z. Holland, U.S. Panel Cochairman

A tentative plan and an outline for the proposed scientific report was sent by the panel cochairmen to each of the principal investigators for comments and suggestions. August 1975 was suggested as the target date for submission of summary results by the investigators.

Energy Budget - A. P. Pinsak, U.S. Panel Cochairman

An outline of the planned scientific report has been approved by panel members, and it is anticipated that a panel meeting will be called in March 1975 to coordinate specific points.

M. Atwater, CEM, has completed verification of the radiation model, to the extent this is possible with available data, and has submitted a final report. Attempts to improve analyzed low cloud amounts were unproductive, but specification of fog and of cloud amounts above a low overcast layer improved the final cloud analysis.

The third phase of General Electric's work on "Ice Formation, Growth, and Decay" will extend the formulation derived from inshore observations to lake scale. This phase will begin in April 1975 and will take one year to complete.

Lake Meteorology - E. M. Rasmusson, U.S. Panel Cochairman J. A. W. McCulloch, Canadian Panel Cochairman

Progress continues in the trial analyses of rawinsonde data for the second intensive observation period, October 30 to November 14, 1972. Results obtained with an advanced, asymptotic singular decomposition (ASD) scheme developed by J. Jalickee of CEDDA indicate that this method is suitable for the sensitive computations required for budget analyses over Lake Ontario. Plans are to adopt this method for the analysis of the entire rawinsonde data set. Application of the method to the IFYGL data is described by J. Sullivan in an internal memorandum, which is available upon request. Results of the budget analyses for the second intensive period will be presented at the 18th Conference on Great Lakes Research in May 1975.

Terrestrial Water Balance - B. G. DeCooke, U.S. Panel Cochairman

Status of data for the lake equation: final monthly values for the Field Year are available for the inflow, outflow, runoff, and groundwater terms; preliminary values of the change in lake storage, precipitation on the lake, and evaporation terms are also available, with final values expected by July 1975.

Status of data for the land equation: final monthly values are available for the runoff and groundwater terms; preliminary values of the precipitation, evaporation, and land storage terms are also available, with final values expected by December 1975.

Estimated dates for the summary reports to be prepared by the principal investigators for inclusion in the final report on the terrestrial water balance are given below. Additional information is needed before a time estimate can be given for the preparation of the final report.

<u>Summary report</u>	<u>Final report</u>	<u>Task No.</u>	<u>Description</u>	<u>Principal investigator</u>
*	No report	8	Runoff	Schutze
*	*	9	Evaporation	Witherspoon/Schutze
Dec. '75	June '76	10	Simulation studies	DeCooke
*	*	11	Precipitation data analysis	Wilshaw/Schutze
Mar. '74	June '75	13	Soil moisture	Embree
Aug. '75	Dec. '75	16	Lake level transfer	Rondy
Feb. '75	Published	23	Outflow	Cox
May '75	Dec. '76	24	Unsteady flow model	Cox
July '75	Sept. '75	30	Lake storage	Wilshaw
*	*	31	Soil moisture	Schutze
May '75	May '75	39	Airborne snow reconnaissance	Peck
Apr. '75	May '75	45	Mapping standing water	Polcyn
Dec. '75	June '76	48	Precipitation	Quinn
Apr. '75	June '75	52	Groundwater	Rhodehamel
Mar. '74	Apr. '75	58	Runoff	Schultz
Sept. '75	Sept. '75	69	Lake precipitation	Wilson
Mar. '75	Mar. '75	70	ERTS data	Wiesnet/McGinnis
June '75	Apr. '74	74	Snow observation network	Sykes
June '75	June '75	11TW	Land storage	Witherspoon
June '75	June '74	13TW	Groundwater flow	MacDonald
*	No report	14TW	Hydrology	MacDonald
June '75	Mar. '75	38TW	Groundwater	Ostry
No report	No report	47TW	Computer model	Jones
No report	No report	49TW	Snow	Adam
*	*	69TW	Pleistocene map	Henderson
*	*	74TW	Water level network	Dohler
*	*	78TW	Basin water balance	Sanderson
June '75	June '75	116TW	Gamma ray survey	Loijens
Mar. '75	Mar. '75	46TW	Inflow	
*	*	108TW	Effect of meteorology on water levels	Dohler

* No date available at this time.

COMPARISON OF AIRBORNE RADIATION THERMOMETER AND BUOY
TEMPERATURE MEASUREMENTS

R. L. Pickett and S. Bermick

During the Field Year, airborne radiation thermometer (ART) flights were made at about weekly intervals over Lake Ontario to record surface temperature. Techniques, sensors, and schedules were described in IFYGL Bulletin No. 7. During these flights, thermistors on the United States and Canadian buoys around the lake were also recording surface temperatures. (See Bulletin Nos. 1 and 3 for instrument details.) From these two data sets, 205 corresponding ART and buoy temperatures for April and September 1972 were compared.

Comparisons showed that the ART ranged from 4.8°C lower to 1.8°C higher than the temperature from the buoy being overflown. The mean difference was 0.4°C, the buoy being higher. The distribution of differences, shown below, was skewed toward higher buoy values, and failed a chi-squared test for normality.

<u>Buoy minus ART (°C)</u>		<u>Percent of observations</u>
less than	-0.5	11
-0.5 to	0.0	28
0.0 to	0.4	18
0.4 to	0.9	18
0.9 to	1.4	12
greater than	1.4	13

The relationship of these differences to other factors was then tested. Calculations showed, for example, no significant correlation between these differences and buoy temperatures; that is, the differences did not appear to be related to the temperature of the water. Similarly, the differences were not correlated with air temperature, air-water temperature difference, buoy type (United States vs. Canadian), or season of the year.

DATA MANAGEMENT

Data Processing

Rawinsonde System

Winds from five IFYGL soundings have been found to be incorrect. These soundings are from the Sodus Point station, November 5, 1972, at 0000, 0300, 0900, 1200 and 1500 GMT.

All the rawinsonde soundings will be validated by April 1, 1975, at CEDDA. At that time, any soundings found in error will be reprocessed, and replacement archive tapes will be forwarded to NCC.

PDCS System

The final edited PDCS data set for May 1972 to March 1973 has been completed. It consists of edited, merged 6-min observations from all sources, with final calibrations applied. These edited 6-min observations are available on seven-track, 800 BPI, BCD tapes. Hourly averages are contained on separate tapes. Microfilm displays of the 6-min and hourly data are also available. Copies of all products have been sent to CCIW and NCC.

It is recommended that the final edited data be used for analysis purposes. Much of the provisional PDCS data set was noisy. Gross errors and, based on station histories, other incorrect data were deleted in the final processing. Based on preliminary analysis at CEDDA, the following comments concerning sensor performance are in order:

Air and water temperature, windspeed, and wind direction--These sensors operated well throughout the period of deployment.

Air pressure--Predeployment and on-site intercomparisons indicate some sensor instability. Time series from individual stations look valid.

Dewpoint--This was the first sensor to go off line when power supply dropped, and data are therefore missing from remote stations much of the time. Also, the element apparently became saturated and gave frequent incorrect readings. On-site intercomparison showed large variations for this sensor.

Longwave and shortwave radiation--Sensor domes may have degenerated physically and/or become heated, and data obtained late in the field program may therefore be in error. The worst of these data were edited out in the final processing.

Precipitation--The sensor design apparently caused problems. The sensor bucket would tip and not reset to zero, the circuit would lock in the open position, and readings would be 1.575 cm/min for several days. These data were edited out in the final data set.

Pan evaporation--Very few data were obtained from this single sensor at the Galloo Island station.

Current speed and direction--Some sensors were recovered in fouled or damaged condition, and care should be taken in using these data. Total number of current sensors deployed was 47. Of these 1 was fouled when recovered, 27 were damaged when recovered, and 5 were lost before recovery.

Ship System

The final 6-min average data are being generated for the 54 IFYGL cruises processed (27 cruises each for the Researcher and the Advance II). Data from 40 cruises have been forwarded on magnetic tape to the IFYGL Archive at NCC.

IFYGL Archive

Tables 3 and 4 contain a summary listing of data available from the U.S. IFYGL Archive at NCC. In the column labeled "Archive," Y = Yes (will be placed in U.S. IFYGL Archive at NCC), YC = Yes (will be placed in IFYGL Archives at NCC and CCIW), and N = No (will not be placed in the Archive). Requests for data should be directed to:

IFYGL Data Manager, Room 52
Environmental Data Service
National Oceanic and Atmospheric
Administration
Federal Building
Asheville, N.C. 28801

Tel: (704) 258-2850, ext. 754; FTS (704) 254-0754.

Table 3.--Summary of data available from final
IFYGL Archive: United States

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>ATMOSPHERIC BOUNDARY LAYER</u>			
3	Bean	RFF/DC-6 (Gust Probe)			
	3.	Reduced turbulence data - Binary	Mag Tape	At NCC	Y
	4.	Computed flux, Time series spectra	Microfilm	At NCC	YC
	5.	Time series graphics (U,V,W,T,PV)	Microfilm	At NCC	YC
	6.	Means, Variances and Fluxes	Microfilm	At NCC	YC
	7.	Plots of Flight Paths	Microfiche	At NCC	YC
	8.	Spatial-Temporal Variations in Turbulence Fluxes	Microfiche	At NCC	YC
5	Businger	Profile Mast and Tower			
	5.	Computed profile & flux data, 15 minute and hourly averages	Mag Tape	May 1975	YC
	6.	Final Report	Microfiche	Jan 1976	YC
	7.	Edited Met. Data - Selected profiles	Mag Tape	May 1975	Y
14	Estoque	Boundary Layer Structure			
	3.	Tethered balloon (BLIP)	Microfilm	At NCC	YC
	7.	PIBAL observations-wind components	Microfilm	At NCC	YC
15	Estoque	Mesoscale Simulation Studies			
	1.	Final Report	Microfiche	June 1976	Y
20	Almazan	Boundary Layer Flux Synthesis			
	1.	Final Report	Microfiche	June 1976	Y
38	Panofsky	Turbulence-Niagara Bar Tower			
	3.	Reduced wind speed fluctuations	Mag Tape	May 1975	YC
	4.	System description report	Microfiche	May 1975	Y
	5.	Two-Point Statistics over Lake Ontario	Microfiche	At NCC	YC
63	Telford	NCAR/DRI Aircraft			
	5.	Final data report-Computed fluxes of momentum, heat, vapor (1/minute)	Microfiche	June 1975	YC
	6.	Final Report	Microfiche	June 1976	Y
	<u>PANEL</u>	<u>BIOLOGY - CHEMISTRY</u>			
1	Armstrong	Sediment Analysis			
	2.	Phosphorus Uptake-Release by Sediments	Microfiche	At NCC	YC
4	Burris	Water Sample - Analysis			
	2.	Final Report	Microfiche		YC
6	Kutkuhn	Status of Fish Population			
	1	Fish samples-Size,Numbers,Scale collections	Microfiche	May 1975	YC
	3.	Water temperature (BT)	Microfilm	May 1975	YC
	4.	Digitized BT-5 fathoms	Pun'd Cards	May 1975	YC
	6.	Final Report	Microfiche	Dec 1975	YC
7	Casey	Material Balance			
	1.	Material balance data in STORET	STORET	At NCC	Y
	3.	Final Report - Streams	Microfiche	July 1975	YC
	4.	Final Report - Main Lake	Microfiche	Dec 1975	Y
12	Thomas	Rochester Embayment Study			
	4.	Current speed and direction, water temperature, wind	Mag Tape	At NCC	YC
	12.	Final Report	Microfiche	May 1975	Y

Table 3.--Summary of data available from final FFYGL
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>BIOLOGY - CHEMISTRY (Con'd)</u>			
19	Hetling	<u>Transport of Nutrients</u> 1. Nutrient transport data in STORET 3. Final Report	STORET Microfiche	At NCC July 1975	Y YC
21	Davies	<u>Hazardous Material Flow</u> 1. Hazardous material data in STORET 3. Final Report	STORET Microfiche	At NCC Dec 1975	Y YC
22	Kim	<u>Remote Measurement of Chlorophyll</u> 3. New Algae Mapping Technique	Microfiche	At NCC	YC
26	Lee	<u>Algal Nutrient Availability</u> 3. Final Report	Microfiche	Sept 1975	YC
29	McNaught	<u>Zooplankton Production</u> 1. Zooplankton data in STORET 6. Final Report	STORET Microfiche	At NCC August 1975	Y YC
33	Moore	<u>Nearshore Study</u> 1. Nearshore data in STORET 5. Final Report	STORET Microfiche	AT NCC May 1975	Y Y
35	Mosley	<u>Benthos Study</u> 1. Benthos study data in STORET 4. Final Report	STORET Microfiche	At NCC June 1975	Y YC
44	Bell	<u>SHENEHON (Ship) Data</u> 2. Final Meteorological/6 minute, Hourly and Daily data 5. Chemical/digitized BT (1 meter) 6. Final Report (Oswego Harbor)	Mag Tape Mag Tape Microfiche	Dec 1975 May 1975 Sept 1975	YC YC YC
46	Polcyn	<u>Cladophora Sensing</u> 1. Cladophora Distribution	Microfiche	At NCC	Y
47	Polcyn	<u>Suspended Sediments Sensing</u> No special report for this task. See Final Report for Task 45, Remote Sensing - Terrain -			
60	Stoermer	<u>Phytoplankton</u> 1. Phytoplankton data 3. Data count-Pre-report 4. Data Analysis-Lakewide Changes 5. Phytoplankton Composition & Abundance	STORET Microfiche Microfiche Microfiche	At NCC At NCC At NCC At NCC	Y YC YC YC
62	Sweeney	<u>River Discharge Impacts</u> 1. Nearshore Bio-Chem STORET data 6. Final Report	STORET Microfiche	At NCC July 1975	Y YC
64	Thomann	<u>Eutrophication Model</u> 1. Final Report	Microfiche	June 1976	Y
66	Thomas	<u>Sediment Oxygen Demand</u> 1. Sediment oxygen data in STORET 3. First Status Report 4. Final Report	STORET Microfiche Microfiche	At NCC July 1975 July 1975	Y YC YC

Table 3.--Summary of data available from final IFYGL
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>BIOLOGY - CHEMISTRY (Con'd)</u>			
67	Thomas	Lake Macrobenthos			
	1.	Distribution of Benthic Organisms	Microfiche	July 1975	YC
	2.	Sediment Particle Size, Composition	Microfiche	July 1975	YC
	3.	Final Report	Microfiche	July 1975	YC
68	Lee	Hazardous Chemicals			
	1.	Hazardous chemical STORET data	STORET	At NOC	Y
	4.	First Status Report	Microfiche	May 1975	YC
	5.	Final Report	Microfiche	May 1975	YC
71	Kutkuhn	Fish Forage Organisms			
	1.	Invertebrate Specimen Inventory	Pun'd Cards	June 1975	YC
	2.	Final Report	Microfiche	Nov 1975	YC
73	Pinsak	Lake Water Characteristics			
	1.	Edited Depth, Temperature, Chemical composition data	Mag Tape	At NOC	YC
76	Robertson	Fauna List			
	1.	Final Report	Microfiche	At NOC	Y
	<u>PANEL</u>	<u>ENERGY BALANCE</u>			
2	Atwater	Net Radiation			
	1.	Interim Reports	Microfiche	At NOC	Y
	2.	Net radiation data for grid	Mag Tape	At NOC	Y
	3.	Final Report	Microfiche	Nov 1975	Y
17	Pavlak	Nearshore Ice Formation			
	2.	Meteorological data-Van (Temperature, Wind, Radiation, Pressure)	Mag Tape	At NOC	YC
	4.	Analysis of Lake Shore Ice Formation, Growth, and Decay-IFYGL Phase 2	Microfiche	At NOC	YC
	5.	Data Report	Microfiche	At NOC	YC
18	Grumblatt	Advection Term-Energy Balance			
	2.	Water temperature, 5-minute intervals	Microfiche	June 1975	YC
	3.	Final Report	Microfiche	June 1975	YC
28	Lyons	Cloud Climatology			
	2.	1 Hour averages (Planimetered)	Microfiche	May 1975	YC
	7.	Final Report	Microfiche	August 1975	YC
36	Hoffeditz	Evaporation Pan Network (US & CDN)			
	1.	Radiation, Incident LW & SW hourly totals	Pun'd Cards	July 1975	YC
	2.	Evaporation Pan data (US & CDN)	Pun'd Cards	July 1975	YC
	4.	4 Reports & Final Report	Microfiche	Oct 1975	YC
40	Piech	Lake Optical Properties			
	4.	Turbidity Measurements - Irradiance meter/transmissometer - graphs	Microfiche	June 1975	YC
	5.	Documentation-Location of measurements. Final Report	Microfiche	Oct 1975	YC

Table 3.--Summary of data available from final IFYGL
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>ENERGY BALANCE (Con'd)</u>			
41	Pinsak	<u>Lake Heat Storage</u>			
	1.	Weekly mean water temperatures for lake cells	Microfiche	June 1976	Y
	2.	Final Report	Microfiche	June 1976	Y
42	Pinsak	<u>Sensible & Latent Heat Flux</u>			
	1.	Final Report	Microfiche	June 1976	Y
43	Pinsak	<u>Lake Thermal Advection</u>			
	1.	Final Report	Microfiche	June 1976	Y
54	Quinn	<u>Lake Ontario Ice Studies</u>			
	1.	Ice Thickness - Manual Measurement	Microfiche	At NCC	YC
		A. 5 sites, weekly			
		B. Ice patterns-graphic display			
		C. Surface meteorological data			
		D. Albedo measurement			
61	Strong	<u>Satellite</u>			
	3.	Final Report	Microfiche	June 1975	YC
	<u>PANEL</u>	<u>TERRESTRIAL WATER BALANCE</u>			
8	Schutze	<u>Runoff</u>			
	1.	Weekly streamflow data	Microfiche	June 1976	Y
	2.	Summary Report	Microfiche	June 1976	Y
9	Schutze	<u>Evaporation (Lake-Land)</u>			
	1.	Weekly evaporation estimates	Microfiche	June 1976	Y
	2.	Final Report	Microfiche	June 1976	Y
10	DeCooke	<u>Simulation Studies</u>			
	1.	Final Report	Microfiche	June 1976	Y
11	Schutze	<u>Lake Precipitation</u>			
	1.	Monthly precip estimates-US Basin	Microfiche	June 1976	Y
	2.	Final Report	Microfiche	June 1976	Y
13	Embree	<u>Soil Moisture and Snow Hydrology</u>			
	2.	Soil moisture tabulated data (1/Month)	Microfiche	May 1975	YC
	3.	Snow Depth - Water equivalent (1/Month)	Microfiche	May 1975	YC
	4.	Stream flow - discharge	Microfiche	May 1975	YC
	5.	Final Report	Microfiche	May 1975	YC
16	Stoughton	<u>Lake Level Transfer</u>			
	1.	Final Report	Microfiche	Dec 1975	Y
23	Cox	<u>Outflow Term TWB</u>			
	1.	Discharge St. Lawrence River	Mag Tape	At NCC	YC
	2.	Final Report	Microfiche	At NCC	YC
24	Cox	<u>Flow Model</u>			
	1.	Final Report	Microfiche	Dec 1976	Y
30	Wilshaw	<u>Lake Storage Term (Water Levels)</u>			
	2.	5-minute water levels	Mag Tape	At NCC	YC
	4.	Edited (Converted to common datum) hourly water levels	Mag Tape	At NCC	YC
	5.	Final Report	Microfiche	Nov 1975	YC

Table 3.--Summary of data available from final IFYGL
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>TERRESTRIAL WATER BALANCE (Con'd)</u>			
31	Schutze	<u>Soil Moisture</u> 1. Weekly soil moisture data 2. Final Report	Microfiche Microfiche	June 1976 June 1976	Y Y
39	Peck	<u>Airborne Snow Reconnaissance</u> 2. Ground truth data 3. Airborne survey water equivalent 4. Soil moisture measurements 5. Snow cover water equivalents 6. Water equivalent - air survey 7. Final Report (Task Summary)	Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche	At NCC At NCC At NCC At NCC At NCC May 1975	YC YC YC YC YC YC
45	Polcyn	<u>Remote Sensing - Terrain</u> 6. Final Report 7. Aircraft flight data record	Microfiche Microfiche	July 1975 At NCC	YC Y
48	Quinn	<u>Island - Land Precipitation</u> 2. Hourly precipitation amounts 3. Precipitation - 80 NWS station 4. Daily Lake Ontario Basin precipitation 5. Final Report	Mag Tape Mag Tape Microfiche Microfiche	At NCC At NCC At NCC May 1975	YC YC YC YC
51	Quinn	<u>Evaporation Synthesis</u> 1. Final Report	Microfiche	June 1977	Y
52	Rhodehamel	<u>Groundwater Wells</u> 3. Summary (chronological list) 4. Final Report	Microfiche Microfiche	May 1975 June 1975	YC YC
58	Schultz	<u>Runoff</u> 1. Tributary stage levels - strip charts (4 USGS gages) 2. Tributary stage levels observations 15 minute-digital USGS gages 4. Tributary stage levels 5. Mean weekly flow 6. Tributary stage & discharge, 35 miscellaneous sites-intermittent 7. N.Y. State Barge Canal data 8. Final Report	Microfilm Mag Tape Pun'd Carts Microfiche Microfiche Microfiche Microfiche	At NCC At NCC At NCC At NCC At NCC June 1975	YC YC YC YC YC YC
69	Wilson	<u>Radar and Precipitation Gage Network</u> 3. Photographs of radar scope 4. Daily total precipitation amounts including precipitation gage data 10. Precipitation data - Rochester network 11. Precipitation data - Oswego snow network 12. Radar data hourly precipitation amounts (by storm) 13. Daily precipitation estimates 14. Collection and analyses of digitized radar data 15. Final Report	Microfilm Mag Tape Mag Tape Microfilm Mag Tape Microfiche Microfiche Microfiche	At NCC June 1975 At NCC June 1975 May 1976 At NCC At NCC May 1976	Y YC YC YC YC Y Y Y
70	Wiesnet	<u>Aerial Hydrological Survey</u> 7. Final Report	Microfiche	April 1975	YC

Table 3.--Summary of data available from final IFYGL
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>TERRESTRIAL WATER BALANCE (Con'd)</u>			
74	Sykes	<u>Snow Observation Network</u>			
	1.	Documentation	Microfiche	June 1975	Y
	6.	Final Report I. Oswego Weather Radar Project 1972/1973	Microfiche	At NCC	Y
	7.	Final Report II. Precipitation Gages plus Snowfall	Microfiche	At NCC	Y
	8.	Final Report III. Supplemental Study 1973/1974	Microfiche	At NCC	Y
	<u>PANEL</u>	<u>WATER MOVEMENT</u>			
27	Liu	<u>Waverider Buoy</u>			
	3.	Digitized wave data (3 samples/second)	Mag Tape	At NCC	Y
	5.	Hourly summary and plot of digitized wave data	Microfilm	At NCC	YC
	6.	Final Report	Microfiche	July 1975	YC
34	Mortimer	<u>Internal Waves - Temperature Transect</u>			
	1.	Water temperature/depth MBT	Microfilm	May 1975	YC
	5.	Temperature Transects	Microfiche	August 1975	YC
	6.	Final Report	Microfiche	August 1975	YC
37	Pandolfo	<u>Simulation Studies</u>			
	1.	Final Report	Microfiche	At NCC	Y
49	Rao	<u>Lake Circulation</u>			
	1.	Final Report	Microfiche	June 1976	Y
55	Saylor	<u>Lagrangian Current Observations</u>			
	1.	Current drogue - Daily plot	Microfilm	May 1975	YC
	2.	Water temperature - Daily chart	Microfiche	May 1975	YC
	3.	Water temperature - EBT X-Y plot	Microfilm	May 1975	YC
	4.	Water temperature - Reversing thermometer	Microfiche	May 1975	YC
	5.	Final Report	Microfiche	May 1975	YC
56	Saylor	<u>Circulation - Currents</u>			
	1.	Final edited current data	Mag Tape	May 1975	YC
	3.	Final Report	Microfiche	Sept 1975	YC
59	Scott	<u>Coastal Chain</u>			
	1.	Current Meter Data, Water Temperature	Mag Tape	At NCC	YC
	2.	Final and Basic Data Report	Microfiche	At NCC	YC
77	Pickett	<u>Physical Lake Properties</u>			
	1.	Current, temperature analysis	Microfiche	Dec 1976	Y
	2.	Final Report	Microfiche	Dec 1976	Y
	<u>PANEL</u>	<u>MAJOR SYSTEMS</u>			
100	MS	<u>Physical Data Collection System</u>			
	2.	Provisional Meteorological and Limnological data (6 minute)	Mag Tape	At NCC	YC
	3.	-Data Listing	Microfilm	At NCC	YC
	4.	-Time Series Graphics	Microfilm	At NCC	YC
	5.	Final Meteorological & Limnological Data (6 minute)	Mag Tape	At NCC	YC
	6.	-Data Listing of 6 Minute Observations and Hourly Averages	Microfilm	At NCC	YC

Table 3.--Summary of data available from final IFYGL
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>MAJOR SYSTEMS (Con'd)</u>			
100	MS	<u>Physical Data Collection System (Con'd)</u>			
	7.	-Time Series Graphics (6 Minute)	Microfilm	At NCC	YC
	8.	-Hourly Average tapes	Mag Tape	At NCC	YC
	9.	Station event logs and histories	Microfilm	At NCC	Y
	10.	System documentation	Microfiche	Dec 1975	YC
	11.	Calibration data	Microfilm	At NCC	Y
101	MS	<u>US IFYGL Ship System-RESEARCHER</u>			
	3.	1 Second data - (1/10 Second, Subsurface)	Mag Tape	At NCC	Y
	4.	EBT On-station data, 6-minute total radiation, Decibar average sub-surface data, 6-minute average data	Mag Tape	At NCC	YC
	7.	Radiation data and 6 minute averages - -Time Series Graphics	Microfilm	June 1975	YC
	9.	Manual observations - Edited	Mag Tape	At NCC	YC
	11.	9-Point digitized EBT	Mag Tape	At NCC	Y
	12.	EBT X,Y traces	Microfilm	At NCC	Y
	13.	Time Series Graphics, 1-second data	Microfilm	May 1975	Y
	14.	EBT Graphics	Microfilm	June 1975	Y
	16.	RESEARCHER Dissolved oxygen traces	Microfilm	At NCC	Y
	17.	Barograph charts	Microfiche	At NCC	Y
	18.	Processing documentation	Microfiche	Dec 1975	Y
	19.	XBT data	Microfilm	At NCC	Y
	20.	XBT data - digitized at NODC	Mag Tape	At NCC	YC
102	MS	<u>US IFYGL Ship System-ADVANCE II</u>			
	3.	1 Second data - (1/10 Second, Subsurface)			
	4.	EBT On-station data, 6 minute total radiation, Decibar average sub-surface data, 6-minute average data	Mag Tape	At NCC	YC
	7.	Radiation data and 6 minute averages - -Time Series Graphics	Microfilm	June 1975	YC
	9.	Manual observations - Edited	Mag Tape	At NCC	YC
	11.	9-Point digitized EBT	Mag Tape	At NCC	Y
	12.	EBT X,Y traces	Microfilm	At NCC	Y
	13.	Time Series Graphics, 1-second data	Microfilm	May 1975	Y
	14.	EBT Graphics	Microfilm	June 1975	Y
	16.	Processing documentation	Microfiche	Dec 1975	Y
103	MS	<u>Rawinsonde</u>			
	4.	Raw Data Time Series Plots	Microfilm	At NCC	Y
	5.	Final data - 5 Second Averages	Mag Tape	At NCC	Y
	6.	Final data-10 Millibar Increments	Mag Tape	At NCC	YC
	7.	Final data-50 Millibar Increments	Mag Tape	At NCC	YC
	8.	Adiabatic charts and listings	Microfilm	At NCC	YC
	10.	Processing document	Microfiche	At NCC	YC
	13.	Documentation and basic information	Microfilm	At NCC	Y
110	MS	<u>STORET Data</u>			
	3.	Final dump - Microfiche	Microfiche	At NCC	Y

Table 4.--Summary of data available from
final IFYGL Archive: Canada

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>ATMOSPHERIC BOUNDARY LAYER</u>			
5	Donelan	<u>Direct Measurement of Energy Fluxes</u>			
	1.	Niagara Bar micromet data	Microfilm	March 1975	Y
	2.	30-min Ave. radiation & water level	Microfilm	At NCC	Y
	3.	30-min Ave. friction & flux data	Microfilm	Sept 1975	Y
15	McBean	<u>Space Spectra in the Free Atmosphere</u>			
	1.	Mesoscale low-level flight data	Mag Tape	At NCC	Y
	2.	Mesoscale low-level flight data	Microfiche	At NCC	Y
28	McBean	<u>Momentum, Heat, & Moisture Transfer</u>			
	1.	Niagara Bar micromet data	Microfiche	At NCC	Y
	2.	Micrometeorological data	Microfiche	At NCC	Y
44	Elder	<u>Analysis of Energy Fluxes</u>			
	1.	Weekly heat transfer	Microfiche	April 1973	Y
	2.	Preliminary estimates	Microfiche	At NCC	Y
	3.	Final estimates	Microfiche	July 1975	Y
	4.	Preliminary investigation of wind stress field over Lake Ontario	Microfiche	At NCC	Y
75	Smith	<u>Wind & Temperature Fluctuations</u>			
	1.	Niagara Bar preliminary data	Microfiche	At NCC	Y
	2.	Niagara Bar final data	Microfiche	At NCC	Y
	3.	Bedford Buoy #1 data	Microfiche	At NCC	Y
97	Elder	<u>Meteorological Buoy Measurements</u>			
	1.	10-min observational data & 1 hour averaged data	Mag Tape	At NCC	Y
	2.	Deleted			
	3.	Field Report	Microfiche	At NCC	Y
	4.	Summary of met. buoy & manual measurements	Microfiche	At NCC	Y
	5.	A met. buoy system for Great Lakes studies	Microfiche	At NCC	Y
107	Shaw	<u>Air Pollution Sinks</u>			
	1.	Sulphate deposition by precipitation	Microfiche	At NCC	Y
	<u>PANEL</u>	<u>BIOLOGY - CHEMISTRY</u>			
54	Gorman	<u>Groundwater Supply Near Kingston</u>			
	1.	Geochemical Study of Deadman Bay	Microfiche	At NCC	Y
81	Salbach	<u>Material Balance Lake Ontario</u>			
	1.	Water quality info-preliminary	Microfilm	At NCC	Y
	2.	Water quality data - tributary streams	Microfilm	At NCC	Y
82	Watson	<u>Lake Ontario Zooplankton Migration</u>			
	1.	Energetics of Vert. Migration in Mysis relicta Loven, 1862	Microfiche	At NCC	Y
	2.	Zooplankton Vert. distribution w/temp., light, & chlorophyll data	Mag Tape	Dec 1975	Y
	3.	Field nutrient excretion	Microfiche	Dec 1975	Y

Table 4.--Summary of data available from final
IFYGL Archive: Canada (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>BIOLOGY - CHEMISTRY (Cont'd)</u>			
83	Christie	Cooperative Studies of Fish Stocks 1. DECCA readings: trawl drags	Microfiche	At NCC	Y
84	Owen	1. <u>Cladophora Growth</u> Location and Extent of Cladophora	Microfiche	June 1975	Y
85	Frazer	1. <u>Nutrient Cycles, Lake Ontario</u> Phosphorus & Nitrogen Cycle on a Transect 2. Chemical data from OOPS cruises	Microfiche Mag Tape	March 1975 At NCC	Y Y
86	Nicholson	1. <u>Lake Ontario Surface Plankton Survey</u> Pigment analysis: chlorophyll "A"	Microfiche	At NCC	Y
98	Carpenter	1. <u>Lake Ontario Cross-Section Study</u> Distribution of zooplankton 2. Phytoplankton data	Microfilm Microfilm	June 1975 June 1975	Y Y
101	Munawar	1. <u>Lake Ontario Primary Production Study</u> Measurement and Prediction 2. Primary production at an Inshore & Offshore Station 3.	Microfiche Microfiche Microfiche	At NCC At NCC May 1975	Y Y Y
102	Glooschenko	1. <u>Lake Ontario Diel Pigment Variation</u> Chemical values of chlorophyll	Microfiche	March 1975	Y
103	Gilbertson	1. <u>Pesticide Concentration in Birds' Eggs</u> Report	Microfiche	Not Known	Y
104	Shiomi	1. <u>Rain Quality Monitoring</u> Composition of Precipitation	Microfiche	Dec 1975	Y
	<u>PANEL</u>	<u>ENERGY BALANCE</u>			
8	Robertson	1. <u>Shore Gauging Stations</u> Hourly averaged water temperature 2. Key punch card documentation 3. Documentation of system	Mag Tape Microfiche Microfiche	At NCC Feb 1975 April 1975	Y Y Y
32	Rodgers	1. <u>Thermal Bar Study</u> Data analysis of core information	Microfiche	Not Known	Y
42	Boyce	1-10. <u>Heat Storage of Lake Ontario</u> Heat content survey of Lake Ontario, 1972: reports 1-10 11. Final Report	Microfiche Microfiche	At NCC June 1975	Y
63	Fitzpatrick	1. <u>Airborne Ice Reconnaissance</u> Charts and photographs	70mm Film		N
71	Latimer	1. <u>Canadian Radiation Network</u> AES radiation data 2. Deleted 3. Documentation	Microfilm Microfiche	Not Known At NCC	Y Y
72	Ramseier	1. <u>Floating Ice Research</u> Navigation Season Extension Studies	Microfiche	At NCC	Y

Table 4.--Summary of data available from final
IFYGL Archive: Canada (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>ENERGY BALANCE (Cont'd)</u>			
73	Judge	<u>Terrestrial Heat Flow</u> 1. Terrestrial Heat Flow through Lake Ontario 2. Mud temperature gradient 3. Thermal conductivity of Lake Ontario 4. Bottom water temperature	Microfiche Microfiche Microfiche 70mm Film	June 1975 June 1975 June 1975 June 1975	Y Y Y Y
80	Davies	<u>Radiation Balance Program</u> 1. Radiation data 2. Radiation data 3. Final Report, Canadian radiation measurements	Mag Tape Printout Microfiche	At NCC At NCC At NCC	Y N Y
87	Boyce	<u>Heat Flow to Lake Ontario</u> 1. Minor turbidity heat contribution	Microfilm	Oct. 1973	Y
	<u>PANEL</u>	<u>FIELD SUPPORT</u>			
1	Thomson	<u>Remote Sensing</u> 1. Lake Dynamics Utilizing Sun-Glint 2. Infrared surveys of Lake Ontario	Microfiche Microfiche	At NCC June 1973	Y Y
30	Rodgers	<u>IFYGL Operations - COGS Porte Dauphine</u> 1. Temperature EBT 2. Conductivity of surface water 3. Chlorophyll samples 4. Hourly meteorological weather data 5. Radiation data 6. Shipboard data 7. Provisional water quality listings	Mag Tape Microfilm Printout	At NCC June 1973 June 1973 June 1973 June 1973 At NCC At NCC	Y N N N N N N
68	CCIW	<u>CCIW Supporting Resources</u> 1. Shipboard data 2. 9-point BT documentation 3. TSAR 4. Shipboard data 5. STAR Monitor layout 6. Shipboard data 7. Provisional water quality listings	Mag Tape Microfiche Microfiche Pun'd Cards Microfiche Microfilm Printout	At NCC At NCC At NCC At NCC At NCC At NCC At NCC	Y Y Y N Y Y N
79	McCulloch	<u>Bathymetric Surveys - Lake Ontario</u> 1. Lake Ontario bathymetric data	Mag Tape	At NCC	Y
94	MacPhail	<u>Data Retransmission by Satellites</u> 1. Data retransmission	Microfiche	At NCC	Y
118	CCIW	<u>Publications</u> 1. Plan of Study for IFYGL 2. Objective Analysis Scheme for Surface Pressure 3. Numerical Models of Airflow 4. IFYGL-1971 Deep Water Buoy Intercomparison 5. Canadian Projects & Supplements 1-4 6. Canadian IFYGL Data Submissions 7/31/74 7. Intercomparison - research aircraft	Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche	At NCC At NCC At NCC At NCC At NCC At NCC At NCC	Y Y Y Y Y Y Y

Table 4.--Summary of data available from final
IFYGL Archive: Canada (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>FIELD SUPPORT (Cont'd)</u>			
250	IFYGL	Weather Summaries			
	1.	IFYGL "WEATHER DATA" Monthly Summary	Microfiche	At NCC	
	<u>PANEL</u>	<u>LAKE METEOROLOGY AND EVAPORATION</u>			
16	Irbe	Airborne Radiation Thermometer Surveys			
	1.	Airborne Radiation Thermometer maps	Microfiche	At NCC	Y
18	McCulloch	Climatological Network			
	1.	Monthly record Canadian Met. data	Report	At NCC	T
	2.	1972 ship data - all Lakes	Mag Tape	At NCC	Y
	3.	Island precipitation data	Microfiche	April 1975	Y
	4.	Hourly Weather Data	Mag Tape	At NCC	Y
20	McCulloch	Bedford Tower Program			
	1.	Bedford Tower met. data	Mag Tape	Dec 1975	Y
21	McCulloch	Canadian Shoreline Network			
	1.	Met. data: shoreline stations	Mag Tape	June 1975	Y
22	McCulloch	Synoptic Studies			
	1.	Synoptic studies analysis	Microfiche	June 1976	Y
23	Pollock	Precipitation in Canada			
	1.	Daily gridpoint values of prec.	Mag Tape	At NCC	Y
	2.	Distrometer & rain-gauge data	Microfiche	At NCC	Y
24	Phillips	Climatological Studies			
	1.	IFYGL Weather Highlights	Microfiche	At NCC	Y
	2.	Surface Weather Maps	Microfiche	At NCC	Y
25	Irbe	Lake Ontario Evaporation by Mass Transfer			
	1.	Monthly estimates	Microfiche	At NCC	Y
27	McCulloch	Island Precipitation Network			
	1.	Supplementary Precipitation Data	Microfiche	At NCC	Y
64	Ferguson	Basin Evapotranspiration			
	1.	Monthly maps of evapotranspiration	Microfiche	Dec 1975	Y
65	McCulloch	Evaporation Pan Network			
	1.	Evaporation pan documentation	Microfiche	At NCC	Y
67	Webb	Atmospheric Water Balance			
	1.	Mean Monthly Temperatures	Microfiche	At NCC	Y
117	McCulloch	APT Photographs			
	1.	ESSA 8 APT photographs	Microfilm	At NCC	Y
	<u>PANEL</u>	<u>TERRESTRIAL WATER BALANCE</u>			
11	Witherspoon	Monthly Water Balance - Lake Ontario Basin			
	1-4.	Means: Land evap., prec., runoff, and storage change	Microfiche	June 1975	Y

Table 4.--Summary of data available from final
IFYGL Archive: Canada (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>TERRESTRIAL WATER BALANCE (Cont'd)</u>			
12	Witherspoon	<u>Monthly Water Balance of Lake Ontario</u>			
	1-6.	Water levels, outflow, inflow, runoff, prec., and evap.	Microfiche		Y
	7.	An estimate of water balance	Microfiche	At NOC	Y
13	Ryckborst	<u>Groundwater Flow Into Lake Ontario</u>			
	1.	<u>Regional Groundwater Flow Between Lake Simcoe & Lake Ontario</u>	Microfiche	At NOC	Y
	2.	Groundwater Inflow From The Canadian Side	Microfiche	At NOC	Y
	3.	Linear Synthetic Hydrographs	Microfiche		Y
14	Russell	<u>Hydrology of Lake Ontario</u>			
	1.	<u>Tributary data</u>	Microfilm	At NOC	Y
	2.	Daily discharge	Mag Tape	At NOC	Y
38	Ostry	<u>Groundwater Contribution</u>			
	1.	Observation wells	Microfiche	At NOC	Y
	2.	Snow courses	Microfiche	April 1975	Y
	3.	Soil moisture	Microfiche	April 1975	Y
	4.	Overburden well yields	Microfiche	At NOC	Y
	5.	Hydrology of Forty Mile Creek	Microfiche	At NOC	Y
	6.	Bedrock well yields	Microfiche	At NOC	Y
	7.	Groundwater chemistry-40 Mile Creek	Microfiche	At NOC	Y
	8.	Surficial Geology, N. Shore-New Castle	Microfiche	At NOC	Y
46	MacDonald	<u>St. Lawrence-Niagara Riv. Measuring Prog.</u>			
	1.	<u>Inflow measurements</u>	Microfiche	At NOC	Y
49	Adams	<u>Snow Stratigraphy & Distribution</u>			
	1-6.	Peterborough area: Met data	Microfiche	Dec 1975	Y
	7.	Peterborough area: Snow data	Microfiche	At NOC	Y
69	Henderson	<u>Pleistocene Mapping</u>			
	1.	<u>Maps and charts</u>	Microfiche	April 1975	Y
74	Dohler	<u>Water Level Network</u>			
	1-6.	<u>Water level data-Port Weller, Toronto, Burlington, Cobourg, Pt. Petre, Kingston</u>	Mag Tape	At NOC	Y
	7.	Format hrly height cards w/header & monthly extreme cards	Microfiche	At NOC	Y
	8.	Water levels	Mag Tape	At NOC	Y
78	Sanderson	<u>Basin Water Balance</u>			
	1.	<u>Estimation of basin evaporation</u>	Microfiche	Dec 1975	Y
108	Dohler	<u>Lake Level Transfer</u>			
	1.	<u>Water level data for Point Petre</u>	Microfilm	At NOC	Y
116	Loijens	<u>Airborne Gamma-Ray Snow Survey</u>			
	1.	<u>Airborne Measurement Snow-Water Equivalent</u>	Microfiche	Aug 1973	Y
	2.	Experimental Snow Survey	Microfiche	At NOC	Y
	3.	Comparison of water equivalent	Microfiche	At NOC	Y
	<u>PANEL</u>	<u>WATER MOVEMENT</u>			
3	Weiler	<u>Stat. Prediction-Lake Currents</u>			
	1.	<u>Lake current models</u>	Microfiche	June 1974	Y

Table 4.--Summary of data available from final
IFYGL Archive: Canada (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	<u>PANEL</u>	<u>WATER MOVEMENT (Cont'd)</u>			
34	Rodgers	<u>Circulation Near Toronto</u>			
	1.	Tower study: current speed & direction, water temp.	Mag Tape	May 1975	Y
40	Csanady	<u>Coastal Chain Study</u>			
	1.	Provisional reports	Microfiche	At NCC	Y
	2.	Final Report	Microfiche	At NCC	Y
	3.	Deleted			
	4.	Daily Summary Presquile	Pun'd Cards	At NCC	T
	5.	Daily Summary: Oshawa	Pun'd Cards	At NCC	T
	6.	Daily Summary: Presquile & Oshawa	Mag Tape	At NCC	Y
43	Boyce	<u>Internal Wave Measurements</u>			
	1.	Transect cross section	Microfiche	April 1975	Y
	2.	Fixed Temp. Profiler (FTP) data	Not Known	April 1975	Y
	3.	Transect tape	Mag Tape	April 1975	Y
	4.	FTP data file	Mag Tape	April 1975	Y
	5.	Transect tapes	Mag Tape	April 1975	Y
45	Bennett	<u>Lake Current Measurements</u>			
	1.	Header information for tape	Microfiche	At NCC	Y
	2.	10-min current temperature data	Mag Tape	At NCC	Y
	3.	Final Report	Microfiche	Dec 1976	Y
70	Falconer	<u>Ground Truth for Remote Sensing</u>			
	1.	Analysis of ERTS & aircraft data	Microfiche	Sept 1975	Y
76	Holland	<u>Surface Wave Studies</u>			
	1.	Cobourg Wave Data	Microfiche	At NCC	Y
	2.	Cobourg Wave Data	Mag Tape	At NCC	Y
	3.	Wave Climate Project for Cobourg	Microfiche	Oct 1975	Y
	4.	Main Duck Island wave data	Mag Tape	At NCC	Y
	5.	Main Duck Island wave data	Microfiche	At NCC	Y
	6.	Wave Climate Project for Main Duck Is.	Microfiche	Oct 1973	Y
	7.	Toronto wave data	Microfiche	June 1973	Y
	8.	Toronto wave data	Mag Tape	At NCC	Y
	9.	Wave Climate Study Project-Toronto	Microfiche	Oct 1973	Y
	10.	Format for Wave Climate Study	Microfiche	At NCC	Y
89	Murthy	<u>Turbulent Diffusion Studies</u>			
	1.	Large Scale Diffusion Studies	Microfiche	At NCC	Y
	2.	Near Shore Diffusion Studies	Microfiche	At NCC	Y
	3.	Lagrangian & current measurements	Microfiche	At NCC	Y
	4.	Diffusion in thermocline & hypolimnion regions	Microfiche	At NCC	Y
95	Simons	<u>Hydrodynamical Modelling</u>			
	1.	Surface Wind Stress	Microfiche	April 1973	Y
	2-3.	Deleted			
	4.	Reports on storm surges during IFYGL	Microfiche	Oct 1973	Y
	5.	Deleted			
	6.	First report: Model study of AGNES	Microfiche	At NCC	Y
	7.	Model study of BETTY storm	Microfiche	At NCC	Y
	8.	Development of Numerical Models	Microfiche	At NCC	Y

